

MOTOR AGE



September 11, 1911

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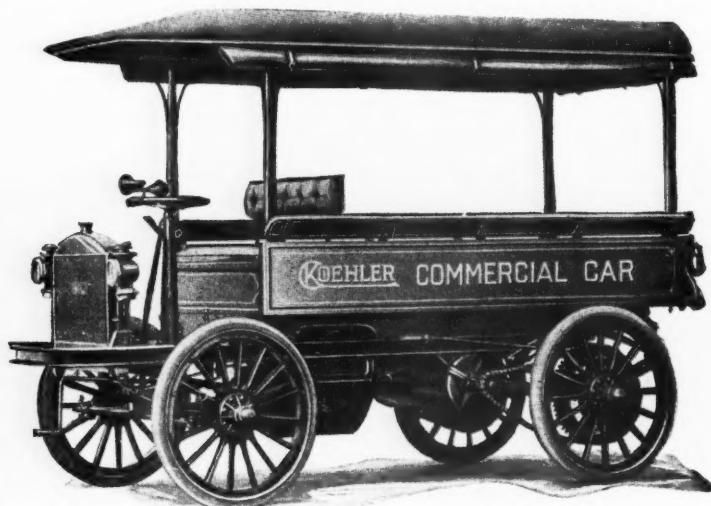
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CARRYING CAPACITY 1600 ^{LBS.} PRICE \$750.

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A Distinctive KOEHLER Feature—Oil tight case in which transmission, bevel gears, differential and metal to metal clutch run in a constant oil bath. This insures positive lubrication—insures against jammed clutches. One supply of oil is good for 1,000 miles.

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COOLING—Thermo-syphon system.

IGNITION—Bosch High-Tension Magneto. No batteries or coil needed.

CONTROL—Left-hand, throttle lever, on steering column.

DRIVE—Direct line double universal joint with jack shaft. Final drive from

jack shaft to rear wheel sprocket through double side chains.

TRANSMISSION—Planetary type. All gears genuine chrome nickel steel, hardened throughout.

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TREAD—58 in.

CAPACITY—1,600 lbs.

WHEEL BASE—90 in. Wheels—36 in. front and rear, artillery type, fitted with demountable rims.

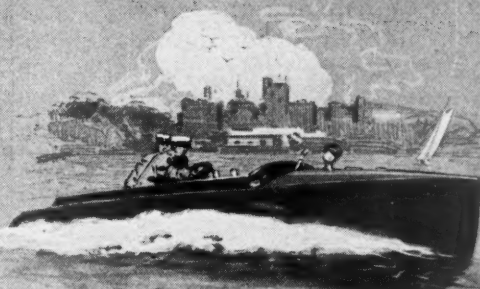
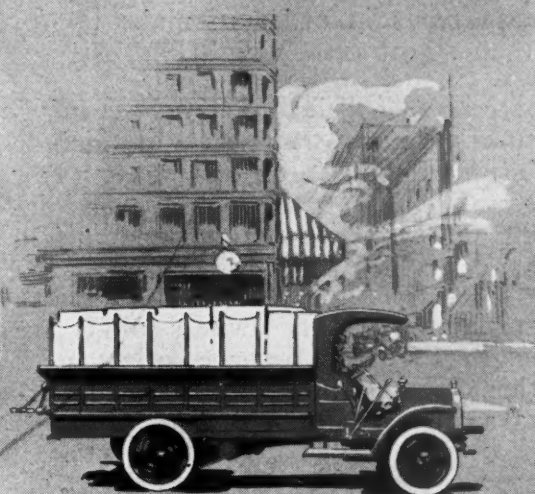
SPEED—4 to 16 miles per hour.

PRICE—\$750 to \$900, depending on body equipment.

OIL TIGHT CASE—In which transmission, differential, bevel gears and metal to metal clutch runs in a **CONSTANT OIL BATH**. 1,000 miles with one supply of oil.

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Little wonder that we add another victory to our long list of triumphs.

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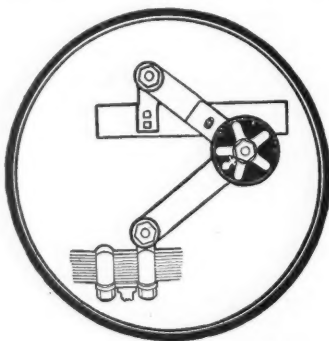
tain parts in order to make up for their slight extra weight.

There are few leading car manufacturers today who do not include Truffault-Hartfords as regular equipment. There are now over 200,000 motorists who enjoy the manifold benefit which their use confers.

Manufacturers and owners alike are urged to take proper cognizance of these facts. They point to the universal preference for the

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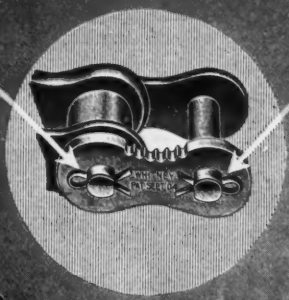
Volume XXIV SEPTEMBER 11, 1913 No. 11

Contents

A 60-MILE-AN-HOUR LIFE.....	5
The story of a modern d'Artagnan who rides through the night on a motorcycle in pursuit of lawbreakers	
CORONA ADDS TO EARL COOPER'S LAURELS.....	10
Stutz driver wins two out of three events at California road racing carnival—Buick captures small-car event	
EDITORIAL—GRADE CROSSING ACCIDENTS.....	12
GOVERNMENT AND STATES CO-OPERATING.....	13
Aid given by congress results in improvement in rural free delivery routes	
ILLINOIS CONVICTS WORKING ON ROADS.....	14
New epoch in highway activity in state marked by employing prisoners	
BRITONS ENDORSE NEW MOTOR FUEL.....	16
Royal Automobile Club committee approves recent discovery—Oil tops successfully used in California truck demonstration	
CONTINENTAL FASHIONS IN DRESS AND CARS.....	18
Illustrations show vogue in French summer resorts	
CYCLECAR DEVELOPMENT	24
New department inaugurated by Motor Age devoted to latest addition to the motor industry	
CAR DEVELOPMENT FOR 1914.....	28
New models of Packard, Stutz and Reo illustrated and described	

DEPARTMENTS

Routes and Touring Information	Among Makers and Dealers....	42
Department	Coming Motor Events.....	42
Readers' Clearing House.....	Recent Incorporations.....	43
Realm of Commercial Car.....	From the Four Winds.....	44
Motorists' Kindergarten.....	Brief Business Announcements.	45
Motor Car Repair Shop.....	With Accessory Makers.....	46



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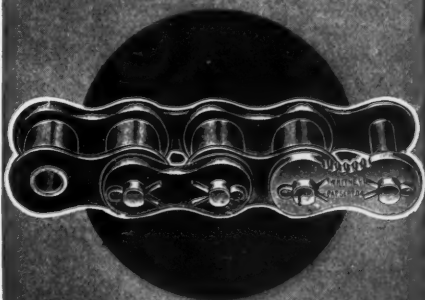
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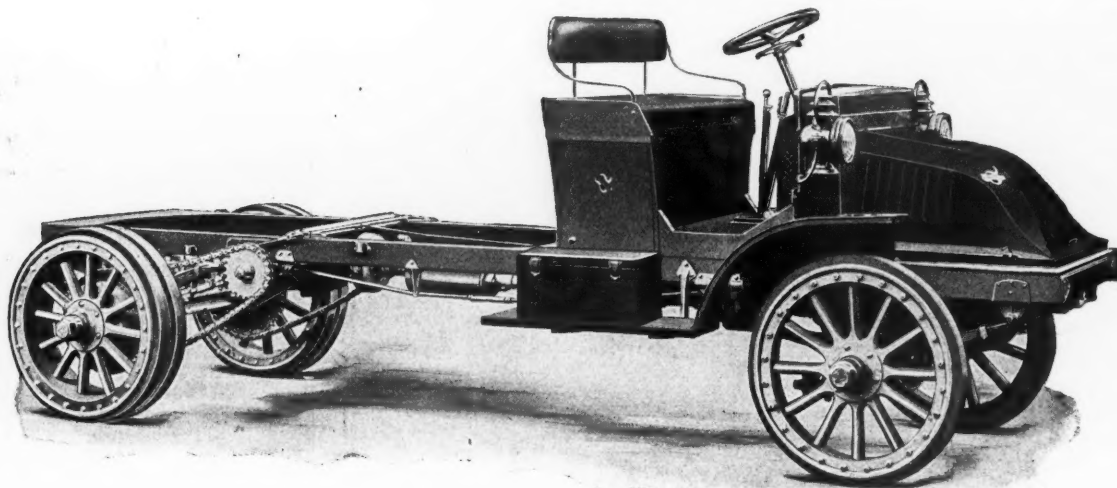
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Cotter Pins*

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With a New Name



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One to Five Ton Capacities

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Our organization is composed of men whose experience covers the life of the motor truck industry—men who literally have grown up with it.

The Horner Truck, therefore, is not an experiment or an untried machine without a record.

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The organization is well equipped financially.

We have the nucleus of a sales and service organization in the field.

We are now building up a complete sales and service organization.

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Less will not be considered.

We have a truck that is new in name only; a truck with a long record of success back of it; with the right kind of manufacturing organization at the factory.

We want men who appreciate these things, and who are willing to make the most of them in their own territories.

On that basis we shall be glad to hear from you and discuss the possibility of a connection.

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Detroit-Wyandotte Motor Co., 100 Fourth St., Wyandotte, Mich.

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MOTOR AGE

A 60-Mile-an hour Life

*The Story of a Modern
D'Artagnan Who Rides
Through the Night on
a Motorcycle in Pursuit of Lawbreakers*

ONE hundred thousand miles astride a motorcycle; patrolling the boulevards of a metropolis in scorching sun, pelting rain and blinding blizzard; giving chase to speed bugs and gay birds; exchanging shots with motor car bandits; trailing yeggs, petty and proficient; intruding on industrious holdup men; rescuing women and children from burning buildings—this has been my life for the past 3 years, a 60-mile-an-hour life that is as fascinating as it is dangerous.

Born to Wear Cop's Blue

As the clerk at headquarters heretofore has done all of my writing—entering my arrests in the big book—I don't expect to make a three-base hit, not even a single, as an author. Because I am shy a Boswell, I'm going to kick away the stand and get going in the high speed without introductory frills and other literary ornaments.

I guess I was just like lots of other kids, crazy about a uniform, and my earliest recollection is of wanting to be a policeman like the old man who was pounding the pavements the night I was born. He was my idol and a good one too. About the first thing he taught me was to be on the square and I never forgot that lesson. Neither did my desire to join the force diminish as I grew older. Walks Stock Yards Beat

I had little trouble passing the police examinations, being stronger than the average man of 21 and having had a good grammar school education, and when I became of age, my youthful wish to parade

in brass buttons and carry a night stick was satisfied.

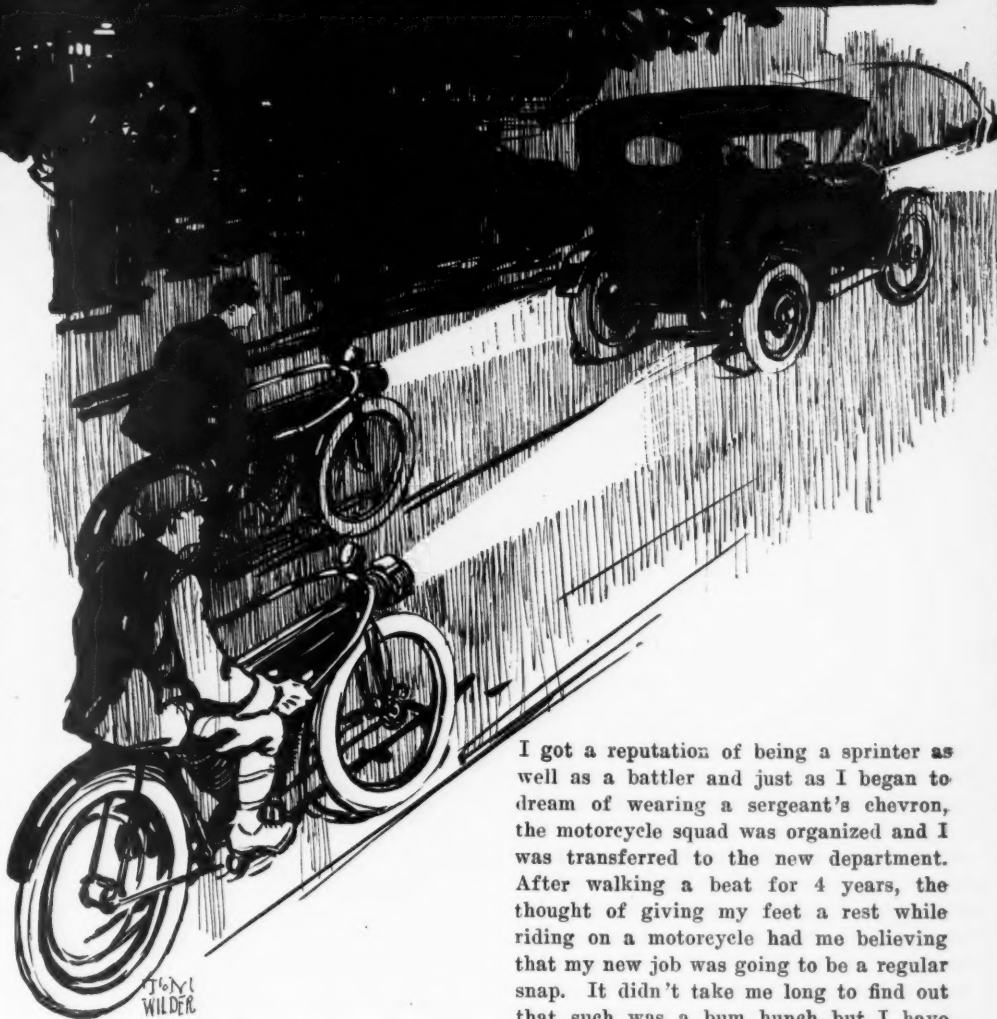
The precinct captain gave me a strenuous workout right at the start, assigning me to the toughest beat in his district. I was guardian of the peace in Polakville where the swarthy-skinned immigrants, after slaughtering hogs and cattle in the stock yards during the day, forgot to sheathe their knives when the 6 o'clock whistle blew and hacked at one another all night for amusement. I worked with the ambulance surgeon. He stopped the flow of blood after I stopped the fights.

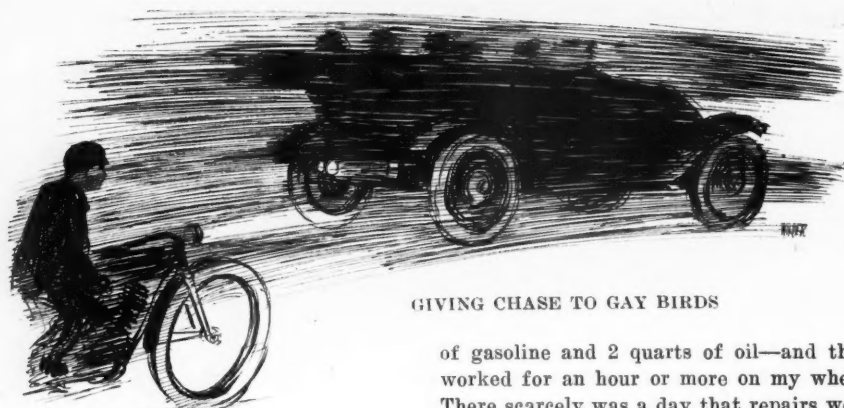
I have a warm spot in my heart for those Hunnies, though. Because of them

I got a reputation of being a sprinter as well as a battler and just as I began to dream of wearing a sergeant's chevron, the motorcycle squad was organized and I was transferred to the new department. After walking a beat for 4 years, the thought of giving my feet a rest while riding on a motorcycle had me believing that my new job was going to be a regular snap. It didn't take me long to find out that such was a bum hunch but I have never had anything against the captain who recommended me to Sergeant Dubach, head of the wheel brigade, despite the fact that I have been laid up in the hospital for repairs four times within 3 years, twice with a broken leg and twice with a fractured skull.

Seven Jobs in One

I hadn't been a member of the new department a week before I learned that a regular job had been wished on me. Talk about versatility, the lightning-change artist who plays sixteen roles in a 15-minute vaudeville sketch has nothing on a motorcycle cop! If you want to stick with the speed squad, you have to be





GIVING CHASE TO GAY BIRDS

policeman, detective, diplomat, acrobat, mechanic, fireman and sprinter. If you fall down on one of these seven jobs, you either get fined, canned or killed.

For excitement and real Lincoln J. Carter thrills I thought the stock yards beat, when I walked it, was a little the best but I soon changed that opinion. The cutting serapes I was mixed up in when I was a patrolman are tame compared with the experiences I have had in 3 years astride a wheel. The Polaks used to slash me up considerably but they were peaceful and most humane alongside my mechanical donkey which has sent me sliding over the cobblestones on my head many times and thrown me through the hood of a motorcar once.

Sticking Close to Work

Talk about sticking close to your work! The motorcycle cop and work are as close as the seconds on a stop watch. He works 14 or more hours a day, 7 days a week and 50 weeks a year unless he is chasing polka-dot elephants or exploring the moon while in a delirium resulting from a spill. He has little time for play. Being on the job is the best thing a motorcycle cop does.

My daily routine was similar to that of the other boys. My alarm clock rang at 11 o'clock in the morning and, after dressing and stowing away my breakfast, I beat it down to headquarters to report for roll call at 12:30 o'clock. After getting instructions from the sergeant, I went to the clerk for my day's supplies—2 gallons



LAIN UP IN THE HOSPITAL FOR REPAIRS

of gasoline and 2 quarts of oil—and then worked for an hour or more on my wheel. There scarcely was a day that repairs were not necessary—tires to be changed, chains to be tightened or loosened, carbureter adjustments to be made and magneto trouble to be remedied.

At 2 o'clock in the afternoon the speed court opened and it was up to me to be in chambers to appear before the birds I had pinched the night before. As my side-kick and I averaged four arrests a day, we generally were in court until 4 or 5 o'clock. As soon as all of our cases were disposed of, it was time to eat supper and get out on our beat.

Envies Clerks and Shop Girls

If there ever was an hour of the day I was sore on my job, it was the 60 minutes between 5 and 6 o'clock when I saw thousands of people knock off work and start in to play, for I knew that my labors had just begun. Some persons think that all I have to do at night is to joy-ride over the boulevards. They are right if they consider chasing speeders, arresting violators of the rear-light ordinance, grabbing chauffeurs operating without licenses, looking out for stolen motor cars and motorcycles, stopping runaways, turning in 4-11 alarms, beating it to fires, picking up vagrants and other suspicious characters and grappling with burglars and holdup men are the ingredients of a joy-ride.

There isn't a night in the year that we don't flirt with death. There always is something happening to keep us from falling asleep on our beat. It is no easy task to travel 60 miles an hour and dodge motor cars, street cars and heavy wagons. It is a test for nerves and eyes. If another vehicle cuts in on you, if you have a blowout, ninety-nine times out of a hundred it's a case of ring for the ambulance and we'll all take a ride—to the hospital. We take the same chances on the streets congested with traffic that the racing driver takes on a specially patrolled track or road racing course. Do you wonder then why, out of a squad of twenty-seven men, there always is from one to four swathed in bandages and being treated by surgeons?

The motorcycle cop beats it whether pavements are slippery or dry, whether streets are crowded or deserted. Skid or no skid, smash-up or no smash-up, it is his duty to catch and pinch offenders and if he is yellow, the best thing he can do is

to hand in his resignation before the sergeant gets wise to him. Fear has yet to break the first motorcycle cop. There isn't a coward on my squad. The boys all are proud of the trust imposed in them and have the courage to make good.

Smash-ups are not the only dangers we have to look out for. There are motor car bandits, stickup men and other criminals constantly running afoul of us who have no scruples about pulling a Gat when cornered and pumping us full of lead. Riding 60 miles an hour may be sport, but riding 60 miles an hour with bullets whistling around your head is another thing.

Cheating the Undertaker

One minute we are dodging wagons and avoiding spills; the next minute we are dodging bullets and cheating the undertaker. Yes, the motorcycle cop leads a gay life, a "nothing to do 'til to-morrow" existence.

Nerve is not the only requisite of the motorcycle cop. He must have judgment or he'll be back pounding the pavements again. The officer who rides a wheel, un-



A CASE OF TOMATOES FOR A DRINK

like the bluecoat who walks a beat, deals with two classes of people, desperate crooks and genteel offenders. He must be a keen student of human nature. The minute he overhauls a speeder he must be able to tell at a glance whether his captive is speeding for an unlawful purpose or speeding for pleasure. It is not always easy to reach such a conclusion.

There are some crooks who dress as well and talk as intelligently as the motorist whose desire to show a friend how fast his car can go gets him into trouble. On the other hand, there are some motorists who look so desperate and talk so insultingly when caught that it is hard to believe that they are not beating it to a fence where they can plant their plunder.

For that matter I suppose that many times the intentions of motorcycle cops are misinterpreted. I'll admit that we are a tough-looking bunch and I can understand easily how a motorist, who we have oozed up to and ordered to put on

the brakes, mistakes us for shakedown artists about to fan him. Excuse me for stealing an after-dinner speaker's stuff and telling a story in this connection.

One cold night last winter when I was heavily bundled up, I halted a speeder on a dark park road. He not only stopped in a hurry but threw up his hands and begged me not to shoot. It was the first laugh I had had in a week and I was tempted to be leient with him.

Identities Must Be Hidden

Had I been dolled up in a blue dress parade uniform and brass buttons probably that bird wouldn't have got such a scare. I have been asked many times, by people who probably have mistaken a motorcycle cop for a desperate character, why we do not wear uniforms. The answer is simple. We don't care to be known. Even the way we dress now, the wise birds have us spotted and the only way we can get the goods on them is to wait on a side street and then tail them when they drive past us. We'd have a fine chance with the crooks if we wore regimentals. We're not only patrolmen, we are detectives and for that reason must hide our identities as much as possible.

Although our work is dangerous, it is very fascinating and there is some sport connected with it. My side-kick, a lithe-limbed, big-hearted dare-devil named Jim, and I have races every night on the boulevards while we are chasing speeders. Although as inseparable as Damon and Pythias, each of us thinks he has something on the other when it comes to getting speed out of a motorcycle and with a gay bird setting the pace, we settle questions of supremacy while pursuing the offender. No contest for a money stake ever was harder fought than these sprints. It is a race all the way, let me tell you, and the victor never has much to brag about. Wheel-to-wheel finishes are the rule and many are the disputes over the claims of a triumph.

The motorcycle cop is an athlete. My squad has a track team that is champion of the local police department and a relay

team, of which I am a member, that won the national title last year. Whenever they get an opportunity, the boys work out either in gymnasiums about the city or at the municipal play grounds and there isn't a soft muscle in the whole bunch. The motorcycle squad also ranks first in revolver shooting. Out of twenty-seven men, twenty-four are classed as expert marksmen and are excused from weekly practice on the range. The other three men, comparatively green on the squad, are so close to the expert notch that they will probably qualify after the next shoot.

Although the majority of the members of the squad are most concerned with the birds and live wires who burn up the boulevards in high-powered cars, four of the boys comprise what is known as the drayage detail and work from 6 o'clock in the morning until 6 at night in the wholesale districts and railroad yards protecting the property of merchants and shippers against unscrupulous teamsters and cunning crooks who have been known to steal an entire wagonload of produce at one haul.

Save Merchants \$10,000 a Year

Before the motorcycle boys were assigned to this work, the merchants of the city lost \$100,000 annually from thefts, according to the report of the Cartage Club, but the drayage detail has been so efficient in its duties that this loss has been wiped out almost entirely.

A crooked teamster in the large city, I found out while I was a member of the drayage detail a year ago, will steal a box of canned tomatoes, valued at \$5 or more, off his wagon and trade it in to a saloonkeeper for two drinks. When the boss checks up on him and finds his load is short, the teamster gets away with the "some guy must have frisked the wagon at one of my stops" alibi.

Some work with clever crooks, driving wagonloads of valuable merchandise to the outskirts of the city and leaving the cart on the prairie to be plundered by agreement. They never report to the



JERRY IS A PROHIBITIONIST NOW

boss again. They get their share of the money coming from the sale of the swag and go out looking for another job. The employer is lucky to get his wagon and team back.

I worked on two interesting cases while on the drayage detail. One day I got the word to be on the lookout for a wagon, belonging to a large commission firm, which had been stolen from the freight depot of the C. B. and Q. railroad while the driver was having the agent sign the receipt. The cart was loaded with butter and valued at \$500. I got the description of the wagon 15 minutes after it was stolen and had a hunch that the crook could not have gotten very far away in a quarter of an hour.

A Bargain Sale in Butter

After searching for the wagon for an hour on the same side of the city that the depot was located, I finally lamped it standing in front of a market in a sparsely-settled district. The crook had closed a deal with the proprietor and was unloading the swag when I rode up. I arrested them both. When I got them in the station, the crook came clean and told how he had given the teamster \$10 to leave the wagon in the freight yard unguarded until he had time to make his getaway. We picked up the teamster 2 days later. He was loafing around one of the teamsters' hangouts.

We are hep to all these places and keep our eye on them. Planting our wheels and taking off our leggings and goggles, we go the rounds of these dives daily and make friends with the gang that polishes the bar with their elbows. They are our stool pigeons only they don't know it. They aren't wise enough to know they are tipping us off to deals and squealing on their pals when they talk too much.

I got a tip once for three shots of whisky that saved a merchant from being done out of \$600 worth of merchandise. A teamster by the name of Jerry worked for him. Jerry never looked very good to me and I decided it wouldn't be a waste of time to watch him. I bought him a couple of drinks and by faking a couple of tricks



I DROPPED, OVERCOME WITH THE SMOKE WHICH WAS SO THICK YOU COULDN'T SEE



JIM DRAGGED HIM OUT BY THE HEELS

I had pulled, got him into my confidence. One night he came in the saloon flashing a roll and after getting his nose good and red, spilled everything for my benefit.

He insisted on buying me a drink. He said it was to be a farewell nip, that he was going to blow the town the next night. I started to ask some questions and he told me that he had framed up a deal with a gang that was to steal his wagon the next morning. He got \$100 for his bit. He even told me where they were going to meet. I was on the job all right and pinched the whole gang. Jerry is a prohibitionist now, doing time in the state boob.

Life of Perpetual Variety

If variety is the spice of life, I'm very well seasoned, believe me. I have had some mighty close calls the 3 years I have been on the force. Only last week I came as near death as I ever want to be again. Jim and I were down at central headquarters in the loop district about midnight when a still alarm came in from a box about 3 miles south. We jumped on our wheels and started to beat it at a 65-mile-an-hour clip. When we reached the scene of the fire—a large apartment building—we found that the firemen hadn't arrived yet although the nearest engine house was only 4 blocks away.

It was some fortunate for two women that we answered the call. They were hanging out of a fourth story window and before we got to them, one had crawled out on the ledge and was about to jump. Jim grabbed her and I took the other and we started down stairs again. I managed to reach the second floor and then I dropped, overcome by the smoke which was so thick you couldn't see. Jim was game though. After rescuing the first woman, he makes two more trips into the building. First he carries out the other female and then he drags me to a place of safety.

We both were recommended to the chief for bravery. I don't think I deserve any honorary mention, but I will be one sore guy if Jim don't get what is coming to him, a medal.

Last winter, a few days before Christ-

mas, Jim and I had another hair-raising experience in the same neighborhood. We got the tip that a burglar had broken into a second story flat. It was up to us to trap him and get the goods on him if we could. After locking the doors behind us as we searched the apartment, we found the crook under the bed just as he was pulling his gun to puncture us. I covered him with my automatic revolver and Jim dragged him out by the heels. When he was searched at the station, sixty-two unset diamonds and a lot of other jewelry were found on him. He is serving time now in the stir and when he gets through doing his bit for last winter's trick, he will be re-arrested to stand trial in another state for croaking a copper who had him cornered.

Sometimes we get our hands on some bad crooks and never know it until after they get away with a small fine for speeding. I remember one case of this sort very well for a gang of ten beat me up so badly I had to go to the hospital. It was a night last August and I was working in the vicinity of a big amusement park. About the time the lights were out at the resort I saw a car beating it down the street and I trailed it. When I got alongside of the speeders, I told them they were under arrest. They gave me the laugh and started off again at a 50-mile-an-hour clip. I jumped off my wheel onto the running board of the car and started to climb into the tonneau. One of the crooks welcomed me with a punch on the jaw. When I pulled my gun, an automatic, the other four hopped me and in the scramble, the business end of my revolver was shoved against my stomach.

Suicide or a Knockout?

It was a case of drop the gun or commit suicide and it didn't take me long to decide that I had a lot to live for. While I was getting mine in the battle royal, another gang of pickpockets, who I found out later were working the amusement park, drove up and joined the other

dips in the slaughter. After using me for a punching bag until they were exhausted, they threw me out on the pavement and were about to drive away when two of the motorcycle boys oozed up and started some target practice.

Out of the flock of ten, the best we could get was three, Joe Feinberg, Harry Cramer and George Vogel. The others made their getaway while my pals were stopping the murder. The next day they were fined \$10 and cost for resisting an officer and blew the town. The next week we found out that each of them had a string of aliases that would stretch from New York to San Francisco. They had all served time for larceny and burglary and Cramer was wanted in three cities for jumping bail. That crowd of dips was the toughest bunch I ever ran up against.

The motorcycle cop works fast. He doesn't waste much time figuring out clues like the detectives you read about in the magazines. How I caught George Mendel and a crook named Conway 25 minutes after they robbed a bakery of \$1100 may serve to illustrate this point.

Making Good a Boast

At 10:30 o'clock one morning last October when I came to the station early to look over a new wheel that I was to ride, we got a tip over the phone that a bakery on the west side of the city had been robbed by two men who escaped in a motor car, No. 69873. As I was the only man on the job at that hour the sergeant sent me out on the case.

"I'll have 'em back here inside of 30 minutes," I told the sergeant as I rode away. Of course I was kidding and never expected to make good.

I beat it over to the scene of the robbery and then started to do a little scouting. I must have ridden about 10 or 12 miles when I got a glimpse of car No 69873. I was so surprised I almost fell off my wheel. The crooks were hitting it up and I started after them. I rode up on the right side of the machine, pulled my gun and ordered them to stop. They must



I COVERED THE CONSCIOUS CROOK

have been hep that I had the goods on them for they opened the throttle up wide and ran me into the curb. I jumped onto the running board just as my new motorcycle was smashed to pieces.

Climbing into the seat beside the driver, I ordered him to drive to the police station. When he started to curse me, I hit him over the head with the butt of my gun and took the wheel, driving with one hand and covering the conscious crook with my revolver which I held in my other mitt.

Mendel and Conway were booked at 5 minutes to 11 and all their swag recovered. Most of the haul was bills which they had hidden in the lining of their caps. Each of them got 1 year.

Mistaken for Car Robbers

There was some speed to that arrest, I blushingly admit, but my former side-kick, a German giant named Emil, and I beat that once in answering a phone call that a car had been stolen out of a private garage. If we had not been so speedy, it would have been more fortunate for Emil. We got to the garage so soon that the owner thought we were the robbers and fired twice at us. Emil stopped both bullets, one lodging in his leg and the other in his stomach. Had he not had such a splendid physique, he would have died. He was in the hospital three months as it was and the doctors thought for a long time that he could not recover.

Next to speeders, motor car thieves give us the most trouble. The majority of them are kids that steal machines in order to joy ride, but we run against some clever crooks in this game sometimes. We are looking for a gang now that did some artistic work.

A suspicious real estate man, from whom the gang rented a barn, gave us the tip. He told us that in November, 1912, three young men had paid a month's rent in advance after leasing the barn for 6 months and had worked for 3 weeks on a car there. About the middle of December they disappeared but had left the machine in the barn. He thought the police better investigate.

Jim and I were detailed on the case. After looking at the car we decided it was an old model since it had no fore-doors, the paint was badly scratched and it was a homely bus, painted a faded green with blue wheels. We took the license number and went to the local agency to trace the owner. The agent, after examining his records, said that a 1912 model with the same number had been brought in early in the fall to be stored in the service station during the winter. He was sure it was still there.

When he looked over his cars, however, he found he was mistaken. The car had disappeared mysteriously. None of the



ONE OF THE CROOKS WELCOMED ME WITH A PUNCH ON THE JAW

employees knew anything about it. We took another look at the dilapidated bus and discovered that the thieves had torn the fore-doors off and painted it with house paint to make it look like an old machine. It certainly was a clever piece of work. They had us all fooled for a time.

Chasing Dishonest Chauffeurs

Chauffeurs who railroad cars often give us a battle. One night last summer I chased one driver, employed by a millionaire living in the suburbs, for 20 miles and then I had to go to his house to arrest him. I caught him speeding through the park and overtaking him, put him under arrest. When I asked his name and address, he started away again, running me into the curb and spilling me. He was three blocks away and going like mad, when I finally got up and mounted my wheel again. Dodging street cars and taxicabs, traveling through the loop district at a 60-mile-an-hour clip and turning corners on two wheels he went clear to the suburbs so fast that I could not overtake him. He drove in a public garage, left his car there and escaped by the back door. The watchman at the garage knew who he was and directed me to his house where I had to pull him out of bed and force him to dress at the point of a gun. He was fined \$200 and costs and worked it out in the boob.

One of the narrowest escapes I ever had and a rescue of which I am most proud was when I dived off my wheel and under an express wagon to pull a little girl from under the hoofs of a team of frightened horses. Before I could grab hold of the girl's dress, one horse kicked me in the

head. I was nearly unconscious but had presence of mind enough to crawl a little nearer. I finally reached the child and pulled her under the wagon. Then I fainted.

Racing the Pay Train

One night last summer I was a movie hero, almost. The only thing that prevented my face being thrown on screens throughout the country was the fact that the film maker wasn't wise to my 20-mile ride over bumpy country roads to foil a train robbery. It was just luck that I got jerry to the job. Along about 7 o'clock I got tired of speeding over the macadam and dropped into a west side pool room where a bunch of toughs hung out, thinking I might get a tip that would make things interesting for me. I got it all right from a guy named Pike Pete who had been double-crossed by his pals.

He put me next to the plans of the gang. It seems that the railroad was doing some construction work about 20 miles south and that the pay train, with about \$10,000 in currency for the wops, was due to pull out at 7:15. Pete's pals were planning to sidetrack the train about 1 mile north of the construction camp and grab the cash. It didn't take me long to decide what to do. I jumped on my wheel and started for the tracks. The train pulled out before I got to the station but I beat it to the switch, emptied my gun at the robbers and watched them tear across the fields just as the pay car skidded onto the side track. Some scenario, what?

All in all, a motorcycle cop earns all the money he gets—\$75 a month the

first year, \$85 the second and \$110 the third—but I wouldn't trade jobs with any dick or desk sergeant on the force.



Corona Adds to Earl Cooper's Laurels

Stutz Driver Wins Two More Races

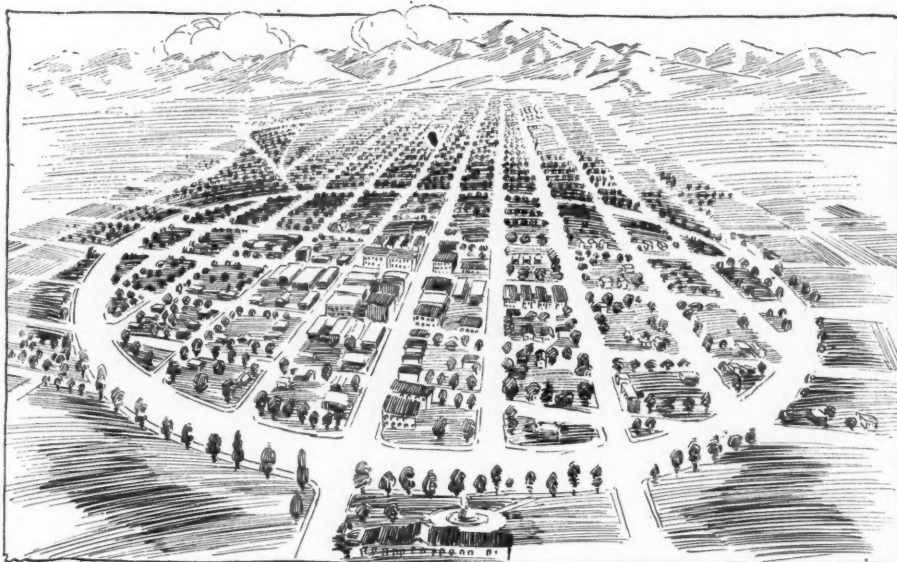
LOS ANGELES, Cal., Sept. 4—Special telegram—Earl Cooper and his sturdy Stutz apparently are invincible. The daring driver and his consistent car, triumphant in two races at Tacoma and winners of the 1913 Santa Monica classic, practically monopolized the victory market at Corona this afternoon by taking the 301.81-mile free-for-all and 251.97-mile medium class events on the circular course of smooth macadam which was dedicated to the gods of speed today.

Three races, run simultaneously, were decided before a holiday throng of 200,000 spectators, who celebrated the anniversary of California's admission to the union by witnessing Cooper's double triumph. The third race on the card, which Cooper might have won had his Stutz been eligible, went to Edward Waterman, of Fresno, a 20-year-old student of the University of California, who piloted a Buick to victory in the small-car race and incidentally hung up a new world's record for cars of 231 cubic inches piston displacement or under by averaging 63.15 miles per hour in his drive of 102.45 miles.

Fail to Break Record

Although a special prize of \$1,000 was offered the driver who shattered Tetzlaff's world's record of 78.7 miles an hour in the 1912 Santa Monica race, Cooper, even with such an incentive, could not equal Terrible Teddy's mark. In winning the medium-car event, Cooper averaged 75.03 miles an hour and when he got the flag in the free-for-all 41 minutes later his average had dropped to 74.63 miles an hour.

It seems fated that Pacific coast classics always are to be won by native sons. The three events of today were captured by Californians, although two speed Lochinvars, Ralph de Palma and Spencer Wishart, came out of the east to dispute the



BIRDSEYE VIEW OF CORONA AND RACE COURSE

ROAD RACE WINNERS SO FAR THIS YEAR

Date	Event	Distance, miles	Winner and Car	M.P.H.
July 4	Los Angeles-Sacramento	443.6	Frank Verbeck, Fiat	39.39
July 4	Albuquerque-Santa Fe	130	"Red" Sperry, Overland	30.01
July 5	Tacoma Potlatch Trophy	200	Earl Cooper, Stutz	71.71
July 5	Tacoma Intercity	102.16	Parsons, Stutz	65.17
July 7	Tacoma Montamarathon	250	Earl Cooper, Stutz	70.71
Aug. 9	Santa Monica	445.2	Earl Cooper, Stutz	73.77
Aug. 29	C. A. C. Cup (Elgin)	301.68	Ralph de Palma, Mercer	66.8
Aug. 30	Elgin National Trophy	301.68	Gil Anderson, Stutz	71.5
Sept. 9	Corona free-for-all	301.81	Earl Cooper, Stutz	74.63
Sept. 9	Corona medium-car race	251.97	Earl Cooper, Stutz	75.03
Sept. 9	Corona light-car race	102.45	Waterman, Buick	63.15

CORONA RESULTS

Free-for-All, 301.81 Miles

Position	Car and Driver	Time	M.P.H.
1	Stutz, Cooper	4:02:38	74.63
2	Fiat, Verbeck	4:10:20	72.33
3	Fiat, Hill flagged on 105th lap.		

National, Jeanette flagged on 77th lap.
Fiat, Tetzlaff, out on 90th lap, engine trouble.
Mercer, Oldfield, wrecked on 59th lap.
Stutz, Magonne out on 41st lap, magneto trouble.
Mercer, dePalma out on 24th lap, cracked cylinder.
Mercer, Wishart out on 12th lap, burned out bearings.

Medium-Car Race, 251.97 Miles

Position	Car and Driver	Time	M.P.H.
1	Stutz, Cooper	3:21:29.5	75.03
2	Marmon, Caldwell	4:09:31	60.59
3	National, Jeanette flagged on 77th lap.		
	Marion, Wilsen flagged on 60th lap.		
	Macomber, Mansfield out on 25th lap, engine trouble.		
	Macomber, Leach out on 17th lap, engine trouble.		
	Mercer, Oldfield; Stutz, Magonne; Mercer, dePalma; and Mercer, Wishart also started in this race but were eliminated for reasons given in free-for-all summary.		

Light-Car Race, 102.45 Miles

Position	Car and Driver	Time	M.P.H.
1	Buick, Waterman	1:37:20	63.15
2	Reo, Jackson	1:41:06	60.8
3	Studebaker, Goode	1:56:12	52.9
	Ford, Owen flagged on 37th lap.		
	Ford, Schank flagged on 35th lap.		
	Studebaker, Trooe flagged on 32nd lap.		
	Studebaker, Rhodes wrecked on 36th lap.		
	Maxwell, Crawford wrecked on 36th lap.		
	Maxwell, Caldwell out on 20th lap, engine trouble.		
	Ford, Pratt out on 11th lap with broken clutch.		

supremacy of the Pacific coast stars. Both de Palma and Wishart, entered in the free-for-all and medium-car events, were forced to abandon their Mercers early in

Buick Takes 161-230 Class Event

the struggle, the Italian on the twenty-fourth lap with a cracked cylinder and his teammate on the eleventh lap with burned out bearings.

Cooper's victory of today follows his triumph of a month ago at Santa Monica and as in the former race, this afternoon's contest was between the Stutz driver and Barney Oldfield until the veteran track driver wrecked his Mercer on the sixtieth lap. Until he came to

grief Barney drove a wonderful race and was leading the ultimate winner by two laps. The spectacular work of the veteran was one of the features of the stirring day.

Oldfield Distinguishes Himself

That Oldfield is not to die under a wrecked car again was demonstrated when his Mercer turned over and over to plunge into the crowd and pile up against a pepper tree. A few minutes after the accident, which was caused by a rear tire leaving the rim and the wheel collapsing, Barney, still chewing his cigar, walked calmly to the stands. Hippodrome artist or not, Oldfield showed today that he is as good as the best. Third place won in the grand prize at Milwaukee last fall seems to have aroused new ambitions in the veteran and in the races on the coast this season he has been driving as he did in his heyday when the fame of Oldfield was known in every cross-roads store.

200,000 See Races

It was a wonderful meet to witness. The Corona course is the most unique in the country. It is a boulevard that forms the boundary line of the city. The course measures 2.7 miles around, is a perfect circle and is canopied by the foliage of luxuriant palm and pepper trees. The 200,000 people who witnessed the races

formed a solid mass of enthusiasm around the attractive highway and the roar of the motors could be heard continually. There was nothing tame about the races. The prizes were rich and the contestants daring. The result was a day of continuous thrills.

From the very start of the free-for-all it was apparent that it was to be a battle of tires, the continual turning putting the rubber to the severest strain. The heavy Fiats started to come into the pits after the eleventh lap and from then on Tetzlaff, Verbeck and Hill, the trio in charge of the Italian cars, were regular callers. Cooper and Oldfield also made their share of changes.

Cooper and Oldfield jumped to the front at the start and at the end of ten laps the latter was leading by 19 seconds. Barney changed a tire on the fourteenth circuit and Cooper on the fifteenth, rapid pit work giving Cooper a slight lead, which he increased to a half lap in five more circuits of the course.

When Cooper stopped on his twenty-third lap to change a tire, Oldfield went to the front but he held that position for only one circuit since he was forced to halt at his pit for a rear shoe the next time around. On the twenty-seventh lap, after gradually crawling up on the Stutz, Barney's Mercer passed the Indianapolis car in front of the stand.

At the end of the thirtieth lap, Magonne, in the other Stutz, had a slight lead on Cooper. Oldfield, who was trailing in third place, began to hit it up from here on and assumed the role of pace-maker on the thirty-fifth circuit. With fifty laps completed, Oldfield was leading Cooper by two laps and when the race was half over had an advantage of 2 minutes.

When Oldfield went out on the sixtieth lap Tetzlaff, in the 120 Fiat, went up into second place and took up the challenge. Lap after lap he was a close second until a cracked crankcase put him out of the running on the ninetieth circuit. From there

on Cooper had the race well in hand, although Hill and Verbeck, winner of the Los Angeles-Sacramento road race of July 4, were always within hailing distance.

In the light-car race William Rhodes and W. W. Warren, driver and mechanic of the Studebaker, were hurt when their car jumped a curb and crashed into another car in the street parking. Warren suffered a fractured skull. H. Sandhoffer, Oldfield's mechanic, received a slight concussion of the brain when Barney's Mercer turned over.

MASON SMASHES RECORDS

Sioux City, Ia., Sept. 4—Rickenbacher, in the Mason, was the star of the dirt track meet which was held here Monday and Tuesday. On the first day he smashed two of Disbrow's records, turning 10 miles in 7:57% and 2 miles with a flying start in 1:31%. The next day he dropped the 2-mile mark to 1:27%, which is unofficial, for it was not electrically timed. The Mason won two firsts, three seconds and one third on the second day.

RESULTS AT MINNEAPOLIS

Minneapolis, Minn., Sept. 6—Thirty thousand devotees of the motor racing fringed Hamline mile track today. Two track records were broken and four spills, none of them serious, marked the closing day of the Minnesota state fair. The track was fast and comparatively free from dust.

Disbrow broke the track record for 4 miles when he won the 5-mile free-for-all in 4:26:05. Endicott was a ripping second and Raimey third.

The summaries:

Five miles, class C, division 3, of 231-300 class—Chandler, Mason, won; Ulbrecht, Case Pirate, second; Milton, Mercer, third; Herey, Suffrage, fourth. Time, 5:16:20.

Five miles, class E, non-stock cars of 300 cubic inches and under—Chandler, Mason, won; Heineman, Case Bullet, second; Rickenbacher, Mason, third; Ulbrecht, Case Pirate, fourth; Milton, Mercer, fifth. Time, 5:03:34.

Five miles, class C, 301-450 class—Rickenbacher, Mason, won; Hearne, Case, second; Broker, Buick, third. Time, 4:55:85.

One-mile time trials to beat world's circular track record of :47.85—Burman, Benz, three trials, :49.79; :49.60 and :50.05; Disbrow, Simplex, three trials, :50.90; :50.25 and :50.60; Raimey, Ohio 999, :53.70; Endicott,

Case Special, :53.70; Disbrow, Jay-Eye-See, :54.

Five miles, class D, free-for-all. First heat, flying start—Disbrow, Simplex, won; Endicott, Case Special, second; Raimey, Ohio 999, third. Time, 4:26:05, announced as breaking the track record made by De Palma in 1910 of 4:29. In the second heat, standing start, the drivers finished in the same order. Time, 4:42:45.

Three miles, novelty race. Cars to race two laps, make complete tire or wheel change and race one lap to finish—Endicott, Case Special, won; Chandler, Mason, second; Disbrow, Case, third. Time, 3:31:45.

Five miles, class E, 600 inches and under—Disbrow, Simplex, won; Chandler, Mason, second; Hearne, Case, third; T. Milton, Jr., Mercer, fourth; Broker, Buick, fifth. Time, 4:45:80.

Five-mile handicap, free-for-all — Disbrow, Simplex, scratch, won; W. Rader, National, second; Milton, Mercer, third; Raimey, Ohio 999, fourth. Winner's time, 4:23.

SEATTLE RELIABILITY RESULTS

Seattle, Wash., Sept. 3—Twenty-one of the twenty-four starters in the Post-Intelligencer reliability tour to Olympia and return reached Seattle yesterday.

Although no official statement can be made at present, it appears as if eleven cars came through with clean scores. Five of these are in the roadster or miniature tonneau class, and six in the touring car class. Those making perfect scores in roadster or miniature tonneau class are: Studebaker, driven by T. F. Barsby; Locomobile, by Edward P. Fick; Chalmers, by George Evans; Cadillac, by Thomas W. Little; Michigan, by Jack Campbell; Touring-Buick, by Captain P. W. Smyly; Cadillac, by M. S. Bringham; Cartecar, by Fred Pentecost; Stearns-Knight, by Harry Hastings, driving for William Campbell; Krit, by H. L. Davies, and Hupmobile, by E. E. Sears.

SAVANNAH WANTS EARLY ENTRIES

Savannah, Ga., Sept. 6—Following his return from the Elgin road races, Harvey Granger, president of the Savannah Automobile Club, today announced that unless there are sufficient entries in by October 1 to insure the success of the meet, that his organization will not attempt to run the Vanderbilt and grand prix road races Thanksgiving week. He also declares that the club will insist on entry fees being made and that no concessions will be made in the way of bonuses or expenses.



CORONA COURSE AT START AND FINISH, WITH EARL COOPER IN WINNING STUTZ IN IMMEDIATE FOREGROUND



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Governor Major Thanks Motor Age

EXECUTIVE Offices, State of Missouri, City of Jefferson.—Editor Motor Age.—I just received Motor Age issue of August 28 containing the contribution with pictures on "Missouri Shows a Nation." They are splendid. I wish to thank you sincerely for the splendid account of the good roads days' proceedings. Never before has there been greater enthusiasm for good roads in Missouri than now. The progressive spirit has spread to other states, and editorial comments from all the great countries of the world are numerous. At the lowest estimate, \$1,500,000 worth of improvement was placed upon the roads of our state during the 2 good road days, and since then hundreds and hundreds of people have continued to work daily, and much permanent work will be continued throughout the entire fall. Thanking you again, and with sincere regards, I am, Yours very truly, E. W. Major, Governor.

Grade Crossing Accidents

DURING the present touring season, which now is nearing its close, the number of accidents at level railroad crossings has increased many fold over that of a year ago. In a leading daily published in a metropolitan city on Monday morning of this week not fewer than eight railroad crossing accidents were reported in different sections of the country in some of which two persons and more were killed. With the great increase in country touring it is but natural that the number of accidents will increase, but of late the increase has been out of proportion and has reached such a crisis that a nation-wide movement to prevent such is only a matter of time. The motor car is here to stay just as much as the railroad is and it is absurd that in many sections of the country our railroads do not provide any more adequate crossing protection in these days of the high-speed motor car than they did 100 years ago when the ox team was in use. Conditions have changed entirely since then and more adequate protection must be provided.

THE crossing signals at many points of railroad intersection with the highway are entirely inadequate. They are in the wrong position and if a car moving at 25 or 30 miles an hour suddenly comes upon one of these crossing signs in a more or less obscure position it is impossible in nine cases out of ten to bring the car to a stop before the crossing is reached. This increases the liability to accident.

THERE are enough motor cars in the country today and enough influence back of them to require every railroad company to mount a second signal, 150 or 200 feet before reaching the railroad crossing. Such signals should be erected by every railroad company at every crossing in addition to the present sign located but a few yards from the track. Until this is done, the hidden grade crossing will continue to exact its annual toll from those who use the roads.

IN addition to more adequate warning signals for day, night signals are essential. The overhead red light should be insisted upon wherever the approach of the train is obscured by bushes, buildings, excavations or other ways. With the signal light must be the signal bell which in itself is not sufficient because it cannot be distinctly heard at great enough distances. The bell should do service 24 hours in the day, and the red signal light from sunset to sunrise. The signal light should burn all the time and not simply before the approach of the train and while it is at the crossing.

IN order to secure protection of this nature which every motorist deserves and which the railroad should furnish, it will be necessary to stimulate activity along this line. Preliminary work could include the appointing of committees for the investigating of accidents and it would be but a second step in the work of such committee to take the matter of prevention of accidents up with the railroad authorities. There are in existence today many societies organized for the sole purpose of preventing accidents, but today to date little has been done to safeguard the fatal grade crossing.

MOTOR clubs in many sections of the country have erected danger signals, but they are irregular and are often misinterpreted by tourists from other states. There must be uniformity in a movement of this nature, the signal for the railroad crossing in one state on the Atlantic must be the same as in a state on the Pacific, because the motor owner of today is becoming a transcontinental tourist and with the increase in the good roads movement this multi-state touring will increase in enormous strides.

GRADE crossing protection must keep in step with the movement of progress of today. The motor car has demonstrated that a new era of road building is essential. The roads that were suitable for horse traffic are signal failures for motor traffic. Road builders have discovered that they must keep in step with the developments of transportation, in a word, that they must build roads suitable to modern traffic. Turn to the railroad: The protection it affords at the grade crossing is no greater today than 100 years ago. This is not keeping in step with progress. It is true that signal bells have been installed in places, but for every one such installation today, 1,000 are needed. The origin of the movement for better protection lies with the motorist, he must form the nucleus. He must set the bell ringing.

ANOTHER factor that is needed to reduce the number of accidents is the enforcement of the rules of the road in the larger cities. The police are prone to forget ordinances which say that slow moving vehicles must keep to the curb, that corners cannot be cut, that rigs cannot stand with the left wheels to the curb and that all vehicles must carry lights at night. If the police can be made to do their duty in this respect, then we will see fewer accidents. Also there should be laws governing pedestrians the same as vehicles and people on foot should be allowed to cross the streets in business districts in big cities.

Government and States Co-Operating in Road-Making

Improving Rural Free Delivery Routes

WASHINGTON, D. C., Sept. 6—A joint document submitted this week to congress by the secretary of agriculture and the postmaster general on the coöperation in road building between the federal government and the several states indicates progress. This good roads movement was in connection with the expenditure of \$500,000 appropriated by congress a little over a year ago for the improvement of such rural free delivery routes as the postmaster general might select.

The arrangement was that the money should be spent in the proportion of \$1 of government money to \$2 of state funds. The object was the improvement of the rural free delivery service to the postoffice and a reduction of its cost. The technical investigation of the subject was left to the office of public roads of the department of agriculture.

The response of the states to the offer of the general government was not so quick as it might have been and the offer of the money was extended for a year, until finally expended. During the first year only Alabama and Iowa responded to the offer, but there are several sections of roads in various states, either definitely decided on or actually under construction. There are now 30 miles in Alabama, 26 in Mississippi, 50 in Minnesota, 50 in Oregon, 6 in Maryland and 39 in Virginia. The money for road improvement in Virginia was split so that there is not only the section of 39 miles from Richmond to Spottsylvania, but an additional 12 miles between Alexandria and Pohick Church. This 39-mile section is a part of the road under construction from Richmond to Washington, and will cost about \$30,000. That in Maryland is a little section from Rockville southwest to the town of Pottomac.

The investigation of the coöperative road building between the federal government and the several states has shown the office of public roads many things that it did not appreciate before in the matter of the utter impossibility of coöperation between the states and the general government under the present laws.

The department is not yet ready to recommend to congress any definite system for national road construction, but this phase of the matter will be treated in the final report and it is expected to be the most important document on road building that has ever been issued by this country.

The investigation so far has shown that with the existing state laws and the work of improvement in the hands of counties and the local road supervisors, it is impossible to get anything extensive or effective accomplished. It is thought in a general way that when congress is sufficiently awakened to the needs of the case it may

be possible to institute a system of national highways running across the several states, about three transcontinental roads east and west and as many north and south. These would be built partly with state money and the annual maintenance secured in the same way.

It is pointed out by the office of public roads that it is impossible to accomplish anything without a centralization of road authority, owing to the immensity of the United States. In this connection it is said that New England is as big as old England, New York and Pennsylvania as big as France, and Texas, Montana and several other of the western states as big as any country in Europe.

Each of these has a road problem as big and as complicated as any European country and the department of agriculture says the only way to effectively handle the interstate road work is to put it primarily under the control of the general government.

FRENCH PRESIDENT A BOOSTER

Paris, Aug. 30—Presidents of the French republic often have traveled with political objects in view, for the furtherance of agriculture, or for the encouragement of some branch of industry, but up to the present no president has made an official motor tour for the encouragement of motoring and touring.

It has been left to President Poincaré to realize that there is as much wealth for the nation in touring as in many branches of manufacture, and to encourage touring in a really practical manner, from September 9 to 15 the president will make an official tour through the central part of France, comprising the old state of Limousin. Few towns will be visited, and these are of comparatively small importance. Starting at Limoges, where there will be an official reception, the president will spend 7 consecutive days on the road in the central hill district. On one night he will

doubtless be the guest of the army and will camp out with the troops.

This tour has been organized by the touring committee of the Automobile Club of France. The object of the scheme—the encouragement of motor touring—was brought before M. Poincaré, who at once decided to undertake the journey. The president will ride in an open car driven by Edmund Chaix, president of the touring committee of the A. C. F. The cortege will comprise about eight or nine cars. At the head of the procession will be two private detectives' cars, and immediately after the president's car there will be about five other cars carrying the presidential staff.

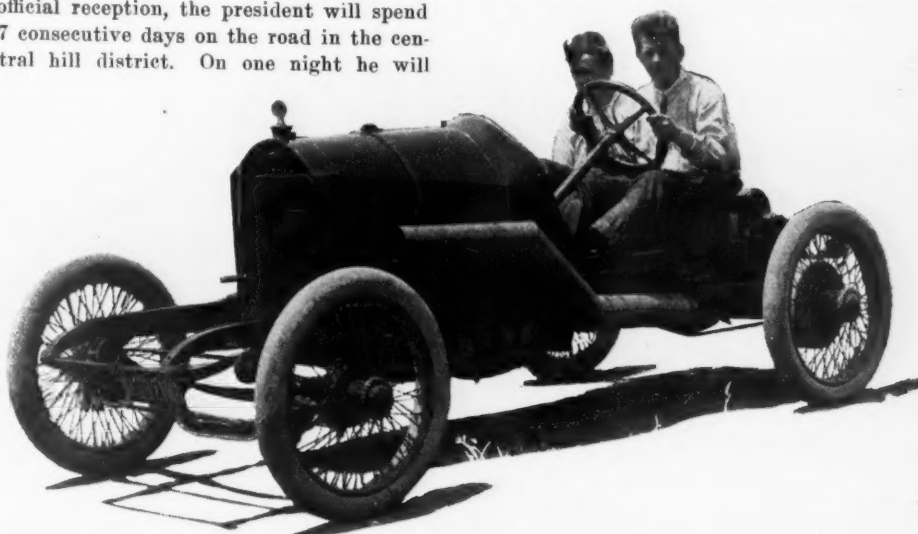
HARRY ENDICOTT KILLED

Jackson, Mich., Sept. 5—Harry Endicott, one of the most prominent of American race drivers, was killed here this afternoon when his car went through the fence at the local track, where he was training for a meet. The car struck and killed a little girl and injured a couple of other persons.

Endicott was one of the members of Moross' team, which also includes Bob Burman, and was a brother of Bill Endicott, of the Case. He was a contestant in the recent Elgin road races and for several years had been prominent in speedway and road racing events in this country.

PATHFINDING IN NORTH DAKOTA

Fargo, N. D., Aug. 30—As an aid to good roads in the state and to obtain notes on a round-the-state highway to report to Governor L. B. Hanna, president of the North Dakota Highways Association, a Cadillac was started on a non-stop run of 621 miles to be completed in 20 hours. The car was ditched 6 miles south of Carrington after traveling 455 miles in 13:20. The tour may result in a highway from Fargo to Devils Lake, Minot, Jamestown and Fargo.



THE LATE HARRY ENDICOTT

Illinois Convicts Put to Work on the Road Near Dixon

New Epoch in Highway Activity in State

DIXON, Ill., Sept. 5—At 3 o'clock on the morning of September 3 a new epoch in the road-building activity of Illinois was started. In the gray dawn of the early morning forty-five trusty convicts set out from the Joliet penitentiary for Grand Detour, a historic town 8 miles from this city, where for the next 60 days they will work upon the highways. For the first time in the history of the state, prisoners have been recruited for road work. It is an experiment—this work at Grand Detour—but it is expected to bear rich fruit.

Before leaving the penitentiary the forty-five convicts who had previously given Warden Allen their word of honor that they would make no attempt to escape, took a solemn secret oath among themselves to deal summarily with any member of the gang who should repudiate his pledge. Under the oath taken, any convict who flees will be hunted down by his fellows and the warden will be petitioned to mete out punishment.

Guards Are Unharmed

Dressed in ordinary working clothes and walking as do law-abiding citizens to their daily labor, the forty-five trusties boarded an electric car and rode for 5 hours to their new home in the open air. They were accompanied by T. F. Keegan and Charles Hardy, former guards at the penitentiary, who will act as foremen of the road-making. Keegan and Hardy left their revolvers and loaded canes behind.

Camp Hope, the new home of the forty-five convicts, was pitched shortly after noon. Here they will remain as long as the weather will permit. They will not wear clothes that will mark them as felons and on Sunday they will have a change of suits and be allowed to receive visits from relatives and friends.

The road to be built leads out of Grand Detour and is in Ogle county. The state engineers have mapped out a plan of action which will change the looks of the scenery in that vicinity when the convicts are done. They will cut through a hill and make about a mile of new road through a piece of timber. Highway Commissioner M. F. Harvey, of Ogle county, will assist Hardy and Keegan in directing the labor of the prisoners.

With the pitching of Camp Hope, the forty-five convicts began life anew. Once at Grand Detour, the men were like a lot of youngsters on a holiday. They unloaded luggage, drove tent stakes and set up kitchen stoves with the zeal of professional men, freed from the cares of office and factory and turned loose to roam in the northern woods.

The slogan of the prisoners was: "We are here to make good."

"The boys back at Joliet are watching us," said one of the convicts. "They



ILLINOIS CONVICTS READY FOR WORK ON STATE ROADS

think that if we make good here the legislature will take off the present 5-year limit and give the lifers a chance to work on the roads."

"Make good, boys!" was the parting injunction of hundreds of unfortunates who were left behind. "It's up to you to help us get out in the sunshine once more."

Although there was some pick and shovel work the first afternoon, the road-building will not start in earnest until the first of the week. It is the intention of the overseers to get the prisoners accustomed to working in the sun before sending them out on the highway.

The forty-five picked men are fortunate in having a road boss who is in sympathy with them. Harvey, the road commissioner, was a deputy in the Joliet prison 20 years ago under the Altgeld regime and knows convicts as well as any man in the state.

Success Anticipated

"I have not the slightest doubt but that the experiment will be a success," said Warden Allen after the camp had been put in order. "These men are picked men and anxious to make good. If one got away all the others would rush after him and capture him if they could. They are frightened lest one of the forty-five does make such a break for liberty. They realize what this means, not only to them but to the men left behind at Joliet and the prisoners at Pontiac and Chester.

"I hope with all my heart the plan goes through. If it does better things are in store for our prisoners and gradually the penitentiaries will be depopulated. It remains for the public at large to do its share. To my way of thinking the biggest thing of all is what the outsiders will do when our men earn their freedom.

"We are now building up men physically and morally with good wholesome food and outdoor work. Will the people of Illinois and other states give these men

welcome when their terms are over? If the old idea that once a criminal always a criminal is discarded Camp Hope beyond a doubt is the beginning of a new era in penology."

Governor Edward F. Dunne has agreed to cooperate with Warden Allen by promising to commute the sentence of each prisoner 10 days for each 30 days that he works outside the prison walls.

Convicts Enjoying Themselves

Swimming and baseball are the diversions of the convicts. There is a plunge in the Rock river every morning and evening when Superintendent Keegan holds up two fingers of his right hand and baseball practice after each meal. Tomorrow afternoon the honor men play a team from the Dixon Y. M. C. A. and Sunday Rev. Whitecomb, of Dixon, will conduct religious services at Camp Hope.

"Camp Hope" is the dominant subject of conversation at the Joliet penitentiary. Warden Allen has lifted the silence ban and prisoners discuss nightly the newspaper reports from the "honor gang dat's outside."

Copied after the Colorado convict system, Illinois' experiment with prisoners working on the highways should be as successful if continued as the campaign under the direction of Warden Tynan, of Colorado, who, in a recent address before twenty-two state governors, reviewed the work of the convicts in Colorado as follows:

"The benefits in this or any other state resulting from a broad and scientific system of convict road-building can scarcely be estimated. Considering the situation in Colorado, and basing our figures on actual experience, we are confident that we can construct more than 5,000 miles of the very finest roadways in the next ten years very finest roadways in the next 10 years adding anything whatever to the burden of the taxpayers.

"During a period of 10 years the inter-

nal revenue fund of Colorado should amount to \$2,000,000. After deducting \$500,000 for road construction, the remaining amount should be wisely expended in bridge building, road repairing and similar purposes. Add to this the financial assistance from the different counties which would enable us to construct not less than 10,000 miles of the finest roadways in the next 10 years. It can be done in Colorado, why should not the same condition apply to other states under more favorable conditions in view of the fact that the roads are naturally better, and it would not cost nearly so much for construction?

Tynan Quotes Statistics

"To illustrate better the great saving to the taxpayers on this class of work and its possibilities, let me quote a few figures from one of our road camps. During 1 month we worked thirty-five men on the road, not including the camp help. The number of days employed was 24½. Each of these thirty-five men rendered to the state labor with a value equivalent to \$2 to \$3 a day per man. The labor for each of these men cost the state exactly 25 cents per day. Had this number of men been employed at the regular standard of wage of say \$2 per day per man, the cost of wages alone would have been \$1,632.50. Each day's work thus represented a net saving of at least \$1.75 per man. The total cost of all the work for the month, including salaries, care of stock, feed for teams and cost of equipment was \$515.15, or 47½ cents per day per man.

"When these figures are considered no one can doubt for a moment the economy of building roads with convict labor. The roads are carefully and thoroughly inspected by competent engineers who testify to the completeness and high character of the work. 'What is the incentive for the men to create such great work?' is a question often asked Coloradans. It is just this: The man who conducts himself so that he is allowed to leave the prison for the road camp has practically seen the last of prison if he conducts himself properly; his food is better; his clothing is better; his self-respect is preserved and he is taught self-reliance and sustained application. He earns an additional 10 days a month during the time he works, which very materially reduces his sentence. Eliminating the policy of armed guards, the men have been placed under skilled and competent overseers and guarded only by their word of honor not to run away. They remain faithful and loyal to their pledges.

"During the last 3 years we have had more than 1,000 individual prisoners in the convict camps. These men without guards—some 300 miles away from the prison—have created a national reputation for loyalty. Less than 1 per cent have violated their pledges by successful escape. Communities no longer fear to have our convict camps established near them. We have made manhood as well as money by

this healthy, hearty outdoors labor. We have built the prisoners up both physically and morally. Men discharged from our road camps do not have the prison pallor, the physical weakness and the hesitation, hang-dog appearance of the typical discharged convict. They are bronzed, sturdy, healthy, efficient laborers and are in demand as such. About 80 per cent of those we have sent out upon the completion of their sentence have made good. The other 20 per cent have mostly found their way back into prison elsewhere."

DISCUSS RIM BURSTING STRAIN

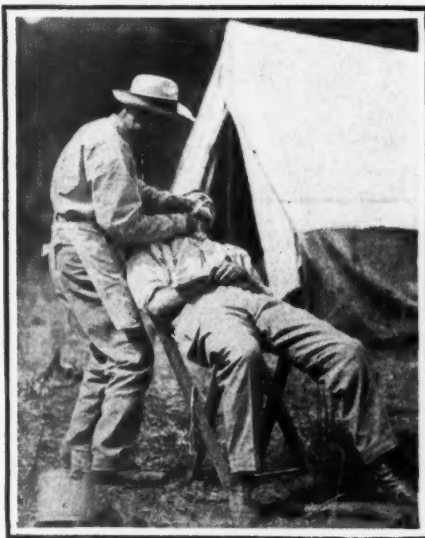
New York, Sept. 10—Special telegram—At a meeting of the passenger car wheels division of the standard committee of the S. A. E. held last night the data secured by tests made by the Hartford and Good-year companies on the strength of the existing types of rims was discussed. A tentative motion was made that an ultimate bursting strength of 200 pounds be specified in rims from 3.5 to 4-inch and 225 pounds for 4.5 to 5-inch. This motion is to be submitted to the entire committee for discussion Howard Marmon and J. H. Wagenhurst went on record as favoring 250 pounds as the higher limit. The entire matter will be further discussed at the next meeting of the division and also at the meeting of the Clincher Tire Association, to be held before the end of this month.

PROMOTION FOR JAMES COUZENS

Detroit, Mich., Sept. 10—James Couzens, formerly secretary and treasurer of the Ford Motor Co., has advanced to the vice-presidency, succeeding John F. Dodge, resigned. Mr. Couzens still retains the treasurership. Frank L. Klinkensmith, former cashier, who has been with the Ford company about eight years, becomes secretary.

ARKANSAS' GOOD ROADS DAY

Little Rock, Ark., Sept. 4—Following the example of Missouri, the residents of



BARBER AT ILLINOIS CONVICT CAMP

Arkansas turned out in large numbers yesterday and today and worked upon the roads in answer to Governor George W. Hay's proclamation setting aside September 3 and 4 as good roads days.

As a result, hundreds of miles of the state's highways are in better shape than ever before. Business was forgotten. Everywhere citizens wielded the pick and spade and the banker put in as many hours of hard labor as the rugged farmer.

Governor Major, of Missouri, who came to Arkansas to give an exhibition of plain and fancy shoveling, put in a good day's work. So did Governor Hays. The two governors, in the regulation overalls, were members of a "gang" assigned to a stretch of roadway near Little Rock.

Except in several counties where the roads were so hard because of lack of moisture that it was deemed inadvisable to work them now, the day was observed all over the state. In hundreds of towns every place of business was closed.

OKLAHOMA USING CONVICTS

Oklahoma City, Okla., Aug. 30—For the purpose of employing convict labor on the proposed east and west and north and south inter-state highways through Oklahoma, the state board of prison control has agreed to loan 500 prisoners from the state penitentiary. It is proposed that the convicts shall be loaned to the several counties through which the proposed highways will pass. The counties will bear all expense, according to present plans.

ACCIDENTS ALARM CHICAGO

Chicago, Sept. 8—City and county officials have become greatly alarmed over the numerous motor car accidents of late, many of which have resulted fatally. The heaviest toll has been exacted at railroad crossings, caused by new drivers failing to exercise proper precautions. Coroner Hoffmann has taken the initiative by organizing a committee consisting of twenty-four prominent citizens, for the purpose of investigating the accidents and possibly recommending safety precautions which might reduce them to a minimum.

Ella Flagg Young, superintendent of schools, has forwarded to all the principals and teachers a set of suggestions which are to be read to the children, instructing them how to avoid accidents. She advises obeying police signals, tells the children to look in all directions before crossing the street and to be particularly careful in crossing the street in front of vehicles, roller skating and girls riding on motorcycles.

WASHINGTON CONVICTS WORKING

Olympia, Wash., Sept. 5—Thirty convicts left the state penitentiary tonight for a road-building camp on the Olympia peninsula. They will constitute the first honor camp for the convicts ever established in this state.

Britons Endorse New Fuel for Motor

Oil Tops Successfully Used on Pacific Coast

CHICAGO, Sept. 4—According to a cablegram received this morning by the Chicago Tribune from London, a new fuel has been found as a substitute for gasoline which will make Great Britain independent of foreign supplies. This comes to light through the announcement of extensive tests by a joint committee from the Royal Automobile Club and other English motoring organizations.

The secretary of the committee says the latter tested a substitute for gasoline which is a by-product of coal, and which hitherto has been unsuitable as motor fuel, and excellent results were obtained. It is stated that a big plant is now being built for commercial production and that 40,000,000 gallons a year will be produced. It can be sold at 28 cents a gallon, as compared with the present price of gasoline of 42 cents a gallon in Great Britain.

Although the dispatch did not give the name of the new fuel, it is the general opinion here that benzole is the product referred to. As has been mentioned in Motor Age before, benzole is a coal-tar product obtained as a by-product of the gas-making plants. British motorists have been experimenting with this fuel for 6 months and look to it as relief from the rapidly-increasing price of gasoline, nearly all of which is imported. Motor, a prominent English motoring magazine, has taken up the new fuel very enthusiastically and has conducted extensive laboratory tests of benzole, ending with a thorough running test at Brooklands track in which thirty-three cars of different makes participated, four of which were American.

These tests have shown that benzole gave an average of 22 per cent greater mileage per gallon than did gasoline when the carbureter is adjusted to give the best results for each, and that there is no more carbonization. The specific gravity of benzole is slightly greater than that of gasoline, and the carbureter float has to be altered and usually a smaller nozzle is required for best results.

British motorists have taken to benzole with great hopes, but the chief difficulty at present is that but few gas-making plants are equipped to purify their by-product so there is little on the market at present. One plant recently has commenced operation for the production of benzole on a large scale. It is figured that the British consumption of gasoline is 100,000,000 gallons a year.

Although the discovery of the new fuel, whether it really is benzole or some more recent find, means much to the motor industry in Great Britain, it is only of scientific interest to American motorists, inasmuch as gasoline can be bought here at wholesale for less than the bare cost of production of benzole.

Experiments here have shown that benzole costs about 18 cents to produce, whereas gasoline can be obtained wholesale at most centers for not over 15 cents. Numerous fuel experts here, including P. C. Crenshaw, of the Standard Oil Co. of Indiana, express themselves as confident that benzole is the fuel referred to in the dispatch.

The Society of Motor Manufacturers and Traders of London recently announced a prize of \$10,000 for a solution of the fuel problem and it is thought possible that the test by the R. A. C. may be preliminary to an award of the prize.

THREE-CENT FUEL ARRIVES

San Francisco, Cal., Sept. 6—The latest step in lowering the cost of motoring is the development of a carbureter which makes it possible to use oil tops, or oil toppings, in gasoline engines. Oil toppings is one of the very lowest grade of liquid fuels and is a by-product of the California petroleum. It is usually drained from the refining tanks and either thrown away or burned in furnaces and its market price in California is 3 cents a gallon. "Toppings" is that portion of the refinings which float on the top of the tanks and is only 41 degrees Baume gravity at 85 degrees Fahrenheit. It is slow in evaporating and under ordinary circumstances is sluggish in combustion.

The first attempt to use it in motor vehicles occurred last week when a 1,500-pound capacity Kissel truck with a 2,000-pound load made a record run of 24 hours 40 minutes from Los Angeles to San Francisco, a distance of 472 miles. The average speed maintained was 18 miles an hour. The time made is said to excel the best previous record of the same course by more than 6 hours.

The car, a stock truck with no special equipment save a carbureter designed to burn low-grade fuel, was driven by W. O. Kern. The carbureter was the Master, made by the Master Carbureter Co., Los Angeles, Cal. It is designed to handle the lowest grades of fuel as well as gasoline, kerosene and distillate.

Forty-six and one-half gallons of oil tops was consumed on the run of the Kissel truck at a fuel cost of \$1.40. This figures out at 9.85 miles per gallon for the 472 miles. At 3 cents a gallon the fuel cost per mile was \$.0003 and the fuel cost per ton mile with the 2,000-pound load was .03 cents. This is less than one-fifth of the cost if gasoline were used instead of the oil toppings.

After his arrival Kern made the statement that "the oil 'toppings' and the carbureter worked perfectly. In fact, the engine had more power with this fuel than with gasoline, and in every test along the

trip the fuel gave entire satisfaction. We had every kind of road to travel and put the car to as severe a test as could possibly be found and the success of the carbureter and oil 'toppings' was demonstrated."

MIDLAND SALE SEPTEMBER 23

Bloomington, Ill., Sept. 8—E. D. McCulloch, trustee for the property of the bankrupt Midland Motor Co., has selected September 23 as the date for the sale of the Midland plant and all tangible assets. An estimate of the assets fixes the total at \$107,376, of which \$40,000 is on the land and buildings; \$20,000 on stock in main room, and \$30,000 on unfinished stock. The property will be offered in parcels and in bulk. With the repair stock will be offered the franchise and right to do business under the name of the Midland Motor Co., together with the good will and trade mark of the company and all patents, drawings and patterns owned by the concern. The real estate consists of 13 acres.

The latest development in settling up the affairs of the company was the arrest of John D. Beebe, former general manager, on a charge of embezzlement of the company's funds. Henry Vierick, a Moline banker, made complaint, asserting that Beebe obtained money from him under false pretenses. A temporary settlement was effected when Beebe paid over to the bank \$9,000. It was learned that the Pope estate turned over to Beebe, through the bank, four motor cars to lessen the liabilities of the people most heavily affected by the bankruptcy. When Beebe failed to make an accounting, a warrant was sworn out. With this settlement, Beebe was allowed his freedom. It is said that other cases of a similar character are pending.

END OF THE GROUT COMPANY

Orange, Mass., Sept. 5—What has often been claimed to be the first building ever erected in this country to be devoted exclusively to the manufacture of motor cars, the old Grout factory, was sold at auction yesterday, and so ends the company. The plant has seen stormy times and for 7 years it has been the subject of litigation. The sale was made by order of the receivers, and there were many people present from Boston, Springfield, New York and other places. The bidding was sharp and much interest was shown.

The plant was sold in four parts. The real estate, including two large factory buildings with machinery, and adjoining shed and a two-story house, was bought by the Orange National Bank for \$19,010. Mortgages and interest on the property totaled \$3,000 more. President F. A. Dexter, of the Orange National Bank, stated after the sale that the bank expects to sell the plant to a new firm looking for a location in Orange. It is not a motor car company. Mr. Kirkpatrick is undecided whether he will continue making parts for the Grout cars that are now in use or devote his purchase to something else. The

Grout was put on the market by members of the Grout family that had made millions in the sewing machine business years ago. But dissensions and litigation tangled up the affairs of the company some years ago when the company seemed to be doing a good business.

HUPMOBILE ENTERTAINS DEALERS

Detroit, Mich., Sept. 8—The sixty Hupmobile dealers in convention at the plant of the Hupp Motor Car Co., Detroit, last week were entertained at a roadhouse at Grosse Pointe by the company. Fifteen Hupmobiles carried them to and from the scene of the festivities. The convention lasted 2 days, during which time the visitors were shown the manufacture of Hupmobiles and listened to talks on the various phases of the selling of these cars by officials of the company.

The Hupp company announced a complete line of four-cylinder models for 1914 which are the same in appearance and general mechanical construction as in the previous year. The small model has been discontinued and the model 32 will be the only four-cylinder type offered. On this chassis are mounted the four-passenger touring, six-passenger, roadster, three-passenger coupe and delivery car bodies.

The greatest change in the new Hupmobiles is the equipping of an electric cranking and lighting system of Westinghouse make which is in-built into the power plant, the latter showing no changes except those modifications necessitated by this electric system installation. The ignition system is independent of the latter. However, the purchaser is given the option of the electric equipment, the price on the four-passenger touring and roadster types being \$1,050 without and \$1,200 with the lighting and cranking together with demountable rims. The six-passenger type is quoted at \$1,200 and \$1,300 for corresponding equipment. The coupe is furnished only with the electric system and is priced at \$1,350. A number of body refinements have been made.

CUTTING AFFAIRS IN COURT

Detroit, Mich., Sept. 10—Special telegram—The sale of the property of the Cutting Motor Car Co., Jackson, Mich., came up for confirmation in the district court yesterday, and Judge Sessions failed to confirm the sale to W. M. Thompson, president of the Jackson City Bank, who offered the sum of \$30,000 in cash and agreed to arrange mortgages for a like amount. Several of the larger creditors were opposed to the sale, claiming that the figure was not large enough, and this in addition to the fact that a petition in bankruptcy has been filed against the concern lay to the action of the court. If the larger creditors do not decline, the usual bankruptcy proceedings will be carried out. The Cutting concern recently filed a denial of bankruptcy, but the Security Trust Co., receiver, advises a withdrawal of this denial so as to hasten the proceedings.

Detroit Engineers Talk on Bearings

Oilless Type Discussed by S. A. E. Branch

DETROIT, Mich., Sept. 8—The Detroit section of the Society of Automobile Engineers gave its attention on September 4 to the subjects of oilless bearings and a new type of worm gear differential.

Leigh S. Bache, general manager of the Graphite Lubricating Co., Bound Brook, N. J., dealt with the oilless bearing both in the impregnated wood and the graphite-filled metal forms. He cited the case of a mill 200 years old which had been torn down only recently, in which the gears, shafting and bearings were of hard wood. For the last years of its operation no oil had to be given the bearings, for they had become so thoroughly soaked with oil for nearly 2 centuries that they had become self-lubricating. The modern wooden bearing, however, gets its lubricating properties before rather than after it is put in use. In the process of making the wood is subjected to from 2 to 5 days' treatment in kettles, where all the moisture is driven out and the graphite filling takes its place. The wood used is hard sugar maple and it is stated that after the treatment it will not swell at all if placed in cold water and only a very little if subjected to the action of hot water.

Where light loads are employed the wooden bearings give excellent satisfaction no matter what the speed of the shafts. They are especially good on tool grinders because the particles of the wheel and the metal which get into the metal-to-metal journals and cut them out will imbed themselves in the wooden bearings and remain there without doing any damage.

Chairman Birdsall cited an application of the wood bushing in motor car construction which has given fine results. He had a motor which ran so quietly that the noise of the balls in the fan bearing and the click of the magneto-breaker were annoying. Wood bearings eliminated the fan noise. It is understood that several well-known motor builders are at the present time using bearings of this type in the cooling fans.

In the graphite-lined or filled bearings both the composition of the metal and the filler are important as is also the pressure with which the mixture is forced in place. The bronze must be both strong and stiff. The mixture must be of a composition and put in at a pressure that will not run out if the temperature of the bearing rises or wash away when oil is used while a surface is being reached. The greatest menace to a good mixture is the presence of too much tale in the graphite.

Mr. Bache had a spirit stove with him by which he demonstrated the permanence of his bearing when subjected to high temperatures. He stated that 10 to 20 tons pressure per square inch was used in forcing the mixture into the grooves in the

metal. It is better to have the grooves and holes cast into the shells rather than machined in, for the slight roughness produced helps to hold the filler in place.

Although graphite-lined bearings will not always solve bearing troubles, it has been shown that where they are used with oil the heating found with a babbitt bearing will be reduced 30 per cent, which is usually enough to cure most heating troubles. Where babbitt bearings work with satisfaction when thoroughly lubricated the oilless bearings will do the same work without oiling after they have been run in with a little oil.

The second paper of the evening was given by W. S. Muehl, in explanation of the claims and construction of the M. and S. differential made by the M. and S. Gear Co., of Kansas City and Detroit.

Ernest Fried made a few remarks on a roller clutch differential which is being developed by the interests back of the Disco Co.

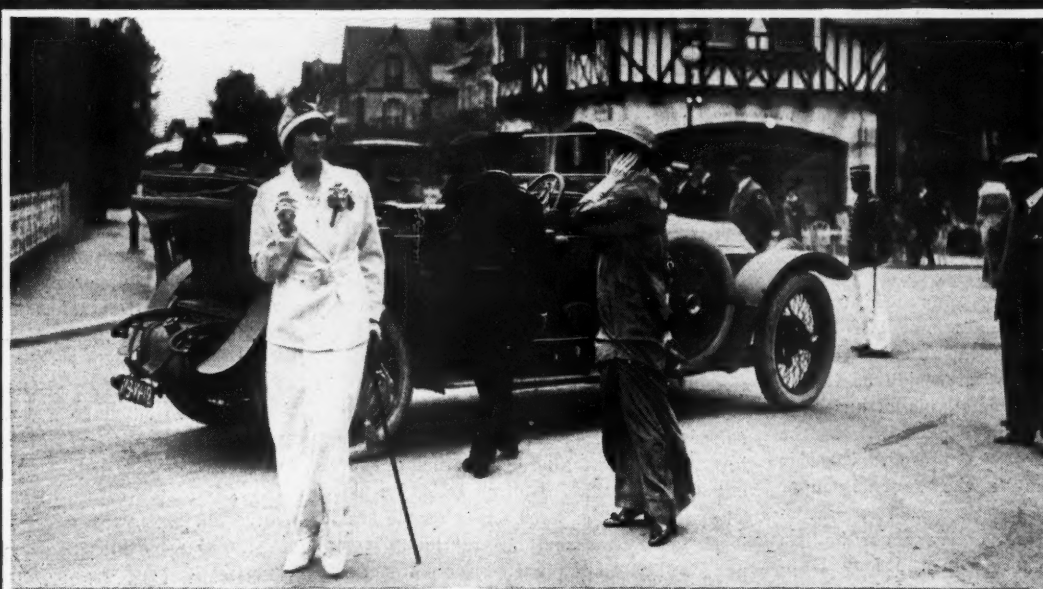
FLANDERS BIDS TOO LOW

Detroit, Mich., Sept. 10—Special telegram—The public auction sale of the plants of the Flanders Mfg. Co. at Pontiac and Chelsea, Mich., which were held on September 8 and 9, brought only one bidder, the Harris Bros., of Detroit. At the time of the closing of the Flanders plants the Harris took option on the properties looking forward to buying them at this sale. Sixty-five thousand dollars was offered for the real estate at Pontiac, although no bids whatever were received on the Chelsea property. The Detroit Trust Co., receiver, is not going to recommend the acceptance of this bid to the court, inasmuch as it considers the amount too low and prefers to let the creditors decide as to what they wish to do. Besides making a bid on the entire property the Harris also made bids on two parcels.

TO SELL R. C. H. PROPERTY

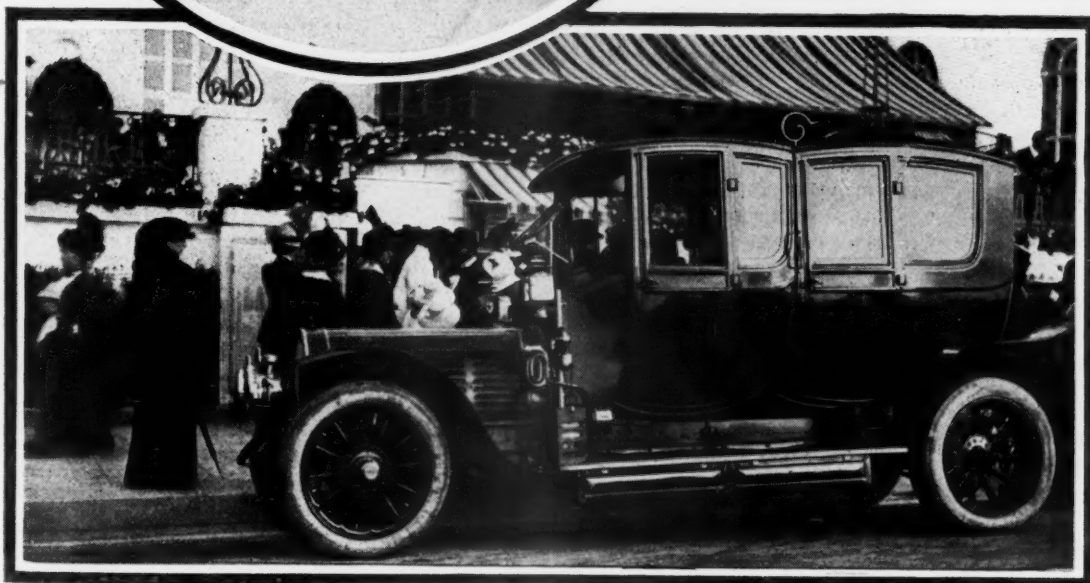
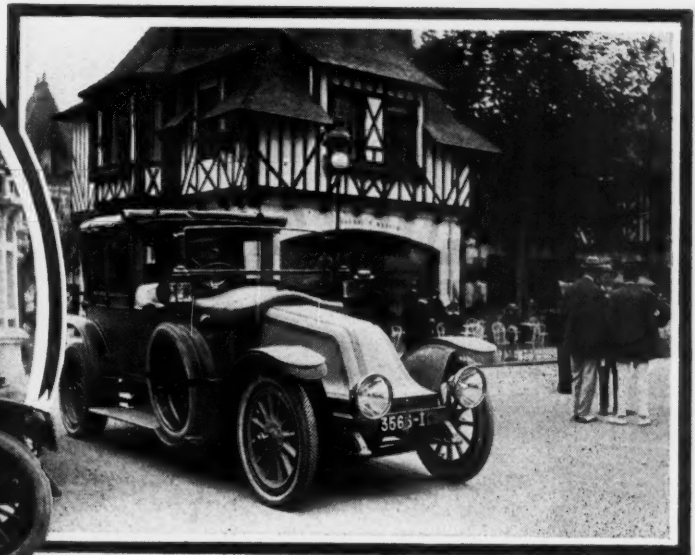
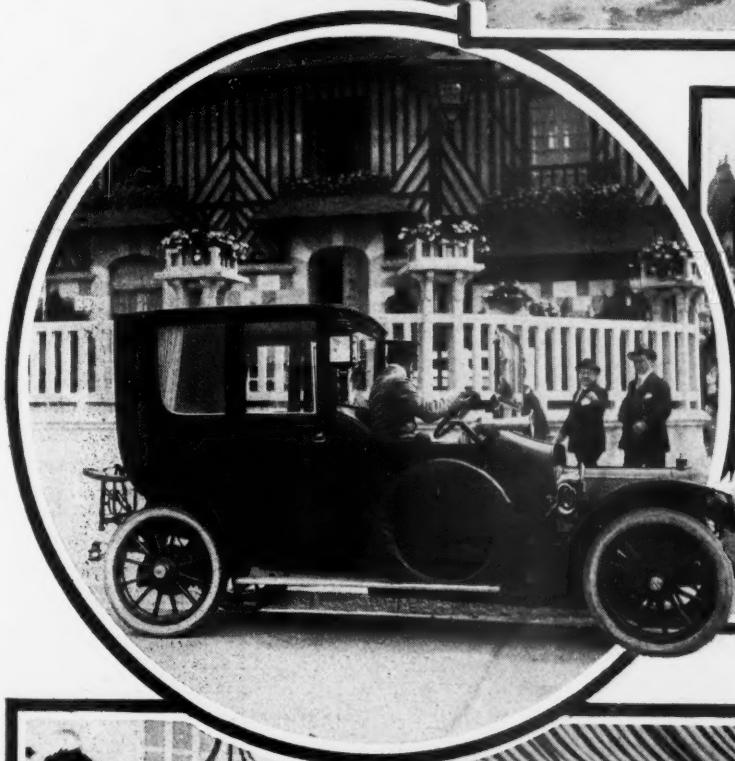
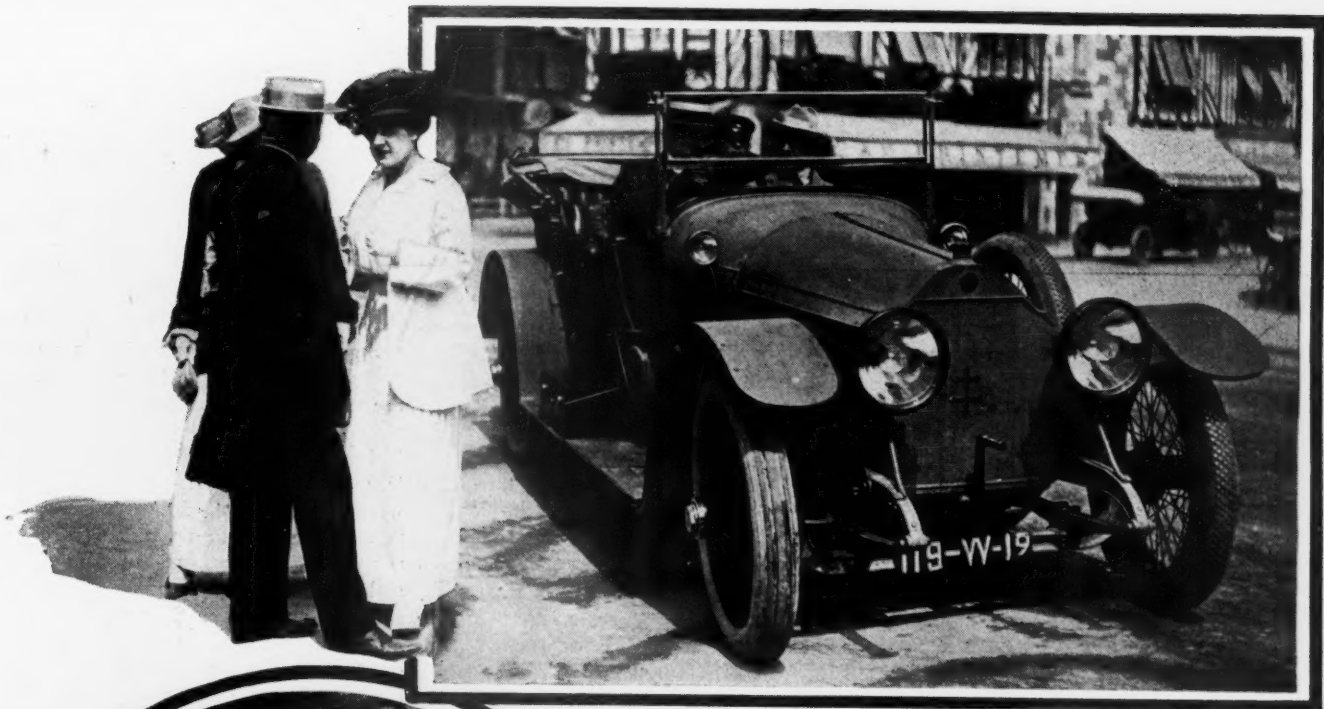
Detroit, Mich., Sept. 10—Special telegram—A meeting of the creditors of the R. C. H. Corp., for which the Security Trust Co., Detroit, is receiver, was held yesterday, ninety creditors being present. The receiver made a report of the business since taking hold, showing that during this term about 200 cars had been shipped. It was pointed out that with this small output it was impossible to run the plant at a profit under the receivership, and after discussion this brought a motion which was passed to the effect that the receiver proceed to a formal sale of the entire property. This procedure will take about 6 weeks. Several of the larger creditors have taken steps looking toward a combine to buy the business, but nothing definite can be given out on that at this time.

Continental Fashions in Motor Dress and Cars



DEAUVILLE and Trouville, holiday resorts on the Normandy coast of Europe, and bitter rivals in every respect, have the common feature of uniting the elite of the French fashionable world. Fashions do not necessarily mean dress and although Deauville and Trouville are not backward in examples of the sartorial art, they have the most brilliant display, during the month of August, of motor cars to be found anywhere in Europe. Although the Parisian element predominates, the tourists represent practically every country in Europe and the body designs displayed at these resorts during the season are from the works of the most renowned Continental masters. Latest continental styles in motor dress and cars are to be had in the accompanying illustrations.





Routes and Touring Information

In the Footsteps of the '49'ers—Part IV

By Darwin S. Hatch



SOME OF THE SHEEP THAT DOT NEVADA'S HILLSIDES

These sheep run in bands of 3,000 and are tended by Indians and watchful collies



BIG RUN CREEK IN THE WESTERN PART OF CALIFORNIA

One of the finest trout-fishing streams in the world. One of the peaks of the Sierras may be seen in the distance

WE found Ely to be a very thriving little city, with particularly wide-awake inhabitants. There is a University club whose headquarters are an old residence fitted up in metropolitan style. Here we were taken in charge by the boosters of the town and supplied with more dry data and wet refreshments than either our stomachs or our brains could assimilate.

Although usually regarded as strictly a mining and stock-raising county, White Pine's agricultural resources are each year receiving more attention. Steptoe valley, in which Ely is located, has too great an elevation for much successful farming, as the season is short and the nights too cold

Spring valley, to the east of Ely, is nearly a thousand feet lower and numerous ranchers and homesteaders are meeting with good success in farming. Here is located the great Cleveland ranch of about 10,000 acres, 3,000 of which is under cultivation.

Ely a Transcontinental Stop

Of late years, the town of Ely has been a favorite stopping place for motor tourists on the transcontinental trip. Parties bound for Los Angeles travel southwest from Ely to Tonopah and Goldfield, while those going to San Francisco take the road straight west from Ely to Eureka and Austin and thence to Reno. The great steam-shovel pit at Copper Flat is of especial interest to eastern tourists, and they may, if they please, see every operation from the time the crude ore is taken out of the ground until it emerges from the converters at McGill in the form of metallic copper, more than 99 per cent pure.

Our next day's trip from Ely to Goldfield started with a climb of 7 miles through the canyon of the Egan range and then around Limestone Peak into a narrow valley called White Sage valley, between the White Pine and the Grant mountains. Southward in this valley led us to Currant, 51 miles from Ely. This is a hamlet consisting of a post-office and two little houses with corn, hay and fruit growing in a fertile valley. Another ranch was passed, 25 miles further, and then we crossed the Pancake range of mountains into Hot Creek valley. Here we ran into a vast table land of volcanic ash

and great ridges of lava whose appearance was explained a little later when we saw the crater of an extinct volcano as the sun pierced the clouds. From here we ran into William's ranch, 126 miles from Ely. This is a large and well-appointed residence, worthy in size and appurtenances to the fashionable homes on the boulevards. We were on the edge of a wide grazing country and with the water supplied by natural springs at the ranch thousands of head of horses and cattle are raised. Then still over good roads surmounted the cloud-capped summit of Hot Creek range into Fish Springs valley.

Twenty-nine miles further we entered the gold country in the Monitor range on a wide table land and from time to time passed the camps of the gold diggers. Every hill and knoll was scarred by the picks of the prospectors. After crossing the Monitor range we started the long, gradual slope through the Ralston valley into Tonopah.

Tonopah, now the center of Nevada's gold and silver mining industry, has settled down after its boom days of a few years ago, following the rich finds in her mountains, and now shows a steady, constant growth of the more stable character that promises to last. The population at present is about 6,000, according to local estimates. There are 125 cars owned in the town and these support seven profitable garages. Gasoline sells at 28 cents and kerosene at 10 cents less.

Goldfield After the Boom

From Tonopah we dropped directly south to Goldfield, 25 miles away. Almost the entire route was dotted with gold and silver mines and all along the trail were the staked-out claims of the hopeful prospectors. The days of Goldfield have passed. The town is built for a population five times as great as it has at present and the rows of abandoned saloons and dance halls with shuttered windows testify to the haunts of the miners in the boom days. As rapidly as Tonopah has grown, more rapidly has Goldfield depleted, her wandering citizens following the fickle goddess of fortune to later finds of gold.

From a population of 30,000 during the boom days the number of residents has decreased to 5,000. Nevertheless it supports the greatest gold mining and reduction plant in the world, the Consolidated. It is said to clear \$900,000 per month net and the ore averages \$23 per ton. The town

boasts 100 cars and supports four garages. Fuel costs the same here as in Tonopah.

Our next day's trip was to take us into California, and we headed southwestward from Goldfield past numerous deserted mining camps to Lida, an active gold camp 28 miles away. Then we started a 2-mile climb with grades averaging 15 per cent to a path between Harney peak and Sugarloaf peak in the Silver Creek mountains. Then through a rocky gorge via the bed of a dry creek in which brilliant lizards scrambled over the rocks and a wind like that from a furnace scorched our faces.

Fifty-two miles from Goldfield we crossed the state line into California at a little ranch called Oasis and commenced a 5-mile climb over White mountain pass. This, like the one preceding, was negotiated in the bed of a dry creek and nearly all the way up the 10 per cent grade we faced the same hot wind. From the top of the pass we descended over a well-made narrow eyelash road which clung to the side of the steep cliff. There were sharp turns and steep pitches and good brakes were needed. In the distance the snow-capped peaks of the Sierras gleamed in the sun.

From near the top of the pass we could look down into a little valley of yellow sand in which there was a little oasis of brilliant green like an emerald set in gold. At the further end was a flashing alkali lake like diamond, to carry out the simile. When we reached the valley we found that with the exception of the oasis, it was a bare waste of sand hemmed in by naked black hills and in which even the sage brush was dying.

A View of Death Valley

At this point we were not far from the notorious Death valley and we could see its dead waste through a break in the cliffs. At the very moment we were gazing at it, we learned later, two motorists were dying of thirst in Death valley after being lost for 3 days with a disabled car.

A 10 per cent grade 10 miles long brought us to the top of White Mountain pass, 7,260 feet high. The climb was through narrow rocky gorges and the air hotter than that encountered even in the desert. It was second-gear work nearly all the way and there were frequent stops to cool. The downgrade was over fine hard sand to a rocky canyon which gave us increasingly wider panoramic views of the Owens valley and the Sierras with Mount Whitney and other summits 12,000 to 14,000 feet high in the distance.

The Route of the Pony Express

The road we followed was the route of the pony express, by which the emigrants and gold seekers crossed the mountains in the days of '49 and over which the gold was carted to waiting pocketbooks in the east. This was originally a toll road and 5 miles on the other side of the pass we found the old toll house and toll gate.

Seventeen miles below we ran into the town of Big Pine, where El Camino Sierra

meets the Midland Trail. El Camino Sierra is the motor road from Los Angeles up the state to Lake Tahoe. Big Pine is in Owens valley, a very fertile district 130 by 20 miles in extent, situated between the White Mountains on the east and the Sierra Nevada mountains on the west. Through it runs the Owens river, while at its southern end is Owens lake, about 20 by 30 miles in extent. From here water is taken for the Los Angeles irrigation canal, which makes fertile the fruit district around that city 287 miles away.

The town of Bishopp, which is the largest in the valley, is 17 miles to the north of Big Pine and is the home of the Inyo Good Roads Club, one of the most progressive motoring organizations we met. After lunch at Bishopp we started northward up the valley and found its end 15 miles away, where we began a 2-mile climb out of the valley. The road was very sandy and the grade 10 per cent. It led through pine barrens where scrub pine and sparse sage



THE EFFECT OF A DESERT DOWNPOUR
Building a temporary road in the bed of a dry creek on the edge of the Great Salt Lake desert



A VOLCANIC PLATEAU IN THE HOT CREEK MOUNTAINS

The plain is a vast floor of volcanic ash and the ridge at the right is almost solid lava with the crater of the volcano in view from the trail

was the only vegetation, then into the United States forest reserve of yellow pine. Typical Eyelash Road

Some of the trees were 5 feet in circumference. Then we entered a canyon along Crooked creek. This was a very narrow, typical eyelash road with sharp turns, a drop of 100 feet or more on the one side and a beetling cliff within hand's reach on the other. The road is well sign-boarded with frequent danger signs. When we arrived at the bottom we found a construction camp where a 10-foot tunnel was being blasted through the mountain as the intake for a hydro-electric plant.



BOX CANYON ROAD IN THE SIERRA
NEVADA MOUNTAINS

A very hot wind blows through the canyon like the blast from a furnace and little lizards scramble over the rocks

Although we had intended to run to Casa Diablo, 14 miles further that day, it was getting dark when we reached the bottom of the canyon and the engineer in charge of the construction camp prevailed on us to spend the night with him. He stated that the climb out of the canyon was more hazardous than its descent had been, and thought it was foolhardy to attempt it in the dark. Our decision to stop over with him was clinched by the sight of between 400 and 500 mountain trout which he and two other men had caught during the day's fishing in the creek. At that, he complained that it had been a bad day for fishing. He advised us to drain the water out of the radiator for fear it would freeze. Although we scoffed at his advice we followed it—and luckily, for before morning the temperature had dropped to 25 degrees Fahrenheit.

The Devil's Castle

In the morning we started our climb to the top of the Sierras. The road out of the canyon seemed no more difficult than the trip into it the evening before, and led us into Meadow valley, where we passed numerous bands of sheep tended by Indians. The sheep run in bands of 3,000 and dot the hillsides so thickly that it is almost impossible to distinguish them from the brush. There were herds of cattle and horses grazing in the valley along what is called Convict creek. The road winds around Convict lake, with a view of Gillette peak at the south and Mount Morrison to the north.

Fourteen miles from our night camp we came to Casa Diablo Springs, so-called because the Indians thought it was the devil's castle from the boiling geyser which spouted to a distance of 4 feet from the ground and all about it for a radius of several yards the sulphur fumes arose from the porous earth.

Topping another rise we found ourselves on the ridge of another divide called Indiana Summit, so named in honor of the Indiana-to-the-Coast tourists who blazed the route for the Midland trail. Down-



THE SNOW-CAPPED PEAKS OF THE
SIERRAS

This view is across Lake Tahoe on the California-Nevada line near Carson City

ward from here over very sandy wood roads through a pine forest to Mono Mills, a logging village on the edge of Mono lake. Gasoline and oil may be obtained here, both at 50 cents a gallon when bought in 5-gallon cases. Mono lake is a body of salt water which is one-fourth solid, so saline that no vegetation can live on its banks. From Mono lake we ran downward over wide, sandy plain literally covered with tiny red flowers so red that the plain looked like a sea of blood. This ended abruptly in a sharp drop into a fertile little valley fed by Rush creek at Farringtons, a collection of ranch houses where flocks of sheep were tended by Indians.



THE DEVIL'S GATE, NEAR CARSON CITY, NEVADA

A break in the rocky cliffs through which the road passes into Carson valley

Correspondence on Routes

Mayor Objects to Statements

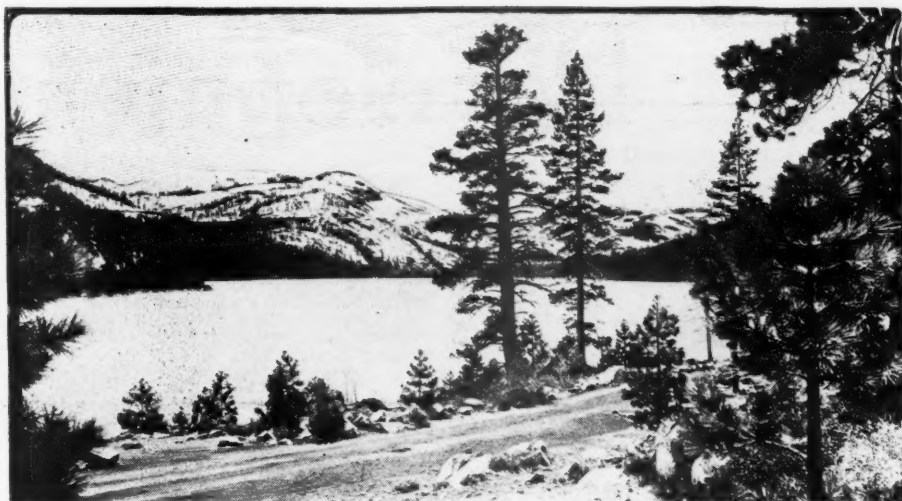
PRICE, Utah—Editor Motor Age—In the August 7 issue of Motor Age appears an article written by Darwin S. Hatch under the caption "What the Indiana-Pacific Tour Means to the Lincoln Transcontinental Highway Movement," to which the people of central and eastern Utah see fit to demur. Although Mr. Hatch writes in a masterful and sincere style and may think he has done his full duty, we feel that justice has not been done the people of this state, and that reparation should be made by giving publicity through the columns of your esteemed publication to certain corrections of some very striking inaccuracies in the article referred to.

Mr. Hatch speaks of the hopelessness of the Utah route because of "700 miles of desert waste such as only those who have breathed its burning alkali and felt the scorching sun can imagine." The distance from Grand Junction to Salt Lake by rail is 291 miles and by motor line registers 331 miles. Your correspondent certainly was careless in designating the desert stretch as a 700-mile run, particularly when he refers to the good roads covering a 70-mile stretch south of Salt Lake City, and also in the vicinity of Grand Junction. Had he supplied himself with correct data as to distances he could not have calculated more than 200 miles of desert.

I was in the pilot machine the day the Indiana tourists made the trip from Grand Junction to Price. It took exactly 8 hours 30 minutes to reach Green River and 5 hours 15 minutes from Green River to Price. The tourists expressed themselves as being well pleased with the road. Had your correspondent done justice to the route he was describing and presumably studying he would have mentioned the 70 miles of abandoned railroad grade from Grand Junction to Cisco which can be utilized for the motor car line and which will make a splendid boulevard, and would also have given publicity to the fact that under a mammoth irrigation project now being completed all the land between Grand Junction and Green River, a distance of 124 miles, will be brought under cultivation. Another quotation from Mr. Hatch is as follows: "To put that road in shape for a permanent surface would cost the entire \$10,000,000 it is proposed to expend on the entire transcontinental road." Competent engineers, who have had charge of road building in this section of the country, advise me that the expenditure of \$500 per mile will put the road in perfect shape for surfacing.

It also is alleged that the road is cut by a coulee or arroyo every hundred yards, down which come rushing torrents, and that the control of these conditions is beyond hope. Men who have had experience in contracting and road building will tell you that the waters have their natural courses and that the work of putting in culverts and bridges to take care of these waters can be very easily accomplished. As to these water courses occurring "every hundred yards" I will state that there are stretches of upwards of 20 miles where the bridge and culvert question is a non-consideration.

Mr. Hatch speaks of traveling 100 miles



DONNER, ON THE WESTERN NEVADA STATE LINE

The lake is in the very top of the Sierra Nevada mountains. It is named for a party of gold-seekers who were massacred here

without the sign of human habitation and asserts it is too much to expect man in such a scattered state to "cope with the elemental forces that rule the waste." Unless he was asleep or blindfolded when leaving Grand Junction he must have observed the thriving towns of Fruita, Mack, Cisco, and Thompsons in traversing 124 miles to Green River, the portion of the road most fittingly designated as the desert stretch.

Referring to the road through Price canyon which is being built by the state road commissioners, your correspondent essays a criticism replete with errors and exaggerations. He mentions it as a 6-foot road between a 100-foot precipice on one side and a verticle or overhanging cliff on the other, also the outward slope of the roadbed which marked the banking in the wrong direction. It is to be regretted that Mr. Hatch could not have given our engineer some advice as to how wide to build a road and how to make the proper slope for motor travel. The facts are that a 20-foot road is being completed, correctly sloped and all necessary work being done to prevent damage from freshets. The greater portion of the road is 3 per cent and but a very short distance reaches a 7 per cent grade.

This piece of road passes through the most picturesque scenery in the inter-mountain region and was the inspiration to many thrilling emotions of admiration expressed by the Indiana tourists. This road is being traveled daily by teams and motor cars and is pronounced a complete success. I have before me statements of those who have investigated other routes across the Rockies and the desert lands to be encountered by a transcontinental line.—W. F. Olson, Mayor.

According to the notes taken by the special investigator of the Official Automobile Blue Book, on the Indiana-Pacific tour, the total distance from Mack to the Utah-Nevada line is 475 miles. In your calculations you neglected that portion of Utah to the west of Salt Lake City.

Your run of 8 hours 35 minutes from Grand Junction to Green River was due to the fact that you were one of the lucky ones who got beyond Thompsons before the cloudburst came. Twenty of us found the gullies rushing torrents which were impossible to ford and were 25 hours covering that 114 miles.

As to the occurrence of washes, I take the following at random from the Blue Book route notes, in which the distances given are measured from Grand Junction: "87.2 miles, deep wash, caution; 87.4 miles, gully, steep, caution; 87.9 miles, caution, gully," etc. Only those which would require more than ordinary care are noted here.

The railroad grade referred to is the abandoned narrow gauge grade of the Denver & Rio Grande and could be made a good road if it were bridged and widened enough to be safe. This, however, would, it seems, require as great an expenditure as the construction of a new road at ground level.

Through the eastern part of Utah there is no stretch on the route where 100 miles may be traversed without seeing human habitation. You forget, however, the portion of the route to the west of Salt Lake City.

Price canyon road was better than could be expected, under the circumstances, but was just as described in the article referred to. The day after we negotiated the canyon the road work was destroyed by a washout, and

is being rebuilt in much better shape.

Motor Age has no desire to do other than assist the tourist by the statement of route conditions. Utah is bidding for the eastern tourist and it was through the eyes of the eastern tourist—the "tenderfoot"—that the Midland trail was viewed. Motor Age could not conscientiously recommend that portion of the trail through Utah followed by the Hoosiers as a safe and comfortable route for the eastern tourist and his family.—Darwin S. Hatch.

Suggests Texas Route

Eddy, Texas.—Editor Motor Age—In reading the Routes and Touring Information I notice that the route given therein for travel from Waco to Austin and San Antonio is via McGregor, Meedy, Pendleton and Temple. This road is about 8 miles longer and no better than that through Lorena, Bruceville, Eddy, Troy and Temple, which route nearly parallels the Missouri, Kansas and Texas railroad. This latter route, which has been sign posted by the Goodrich company, is almost a bee line from Waco to Temple, while the former makes a big elbow to reach McGregor.—E. F. Barth.

Louisville-St. Louis-Chicago-Louisville

Louisville, Ky.—Editor Motor Age—Please give me the best route from Louisville to St. Louis, Mo.; St. Louis to Chicago; and Chicago to Louisville. I understand there are two routes to St. Louis, i.e., via Indianapolis, the longer and possibly worse road, and a shorter via French Lick.—L. H. L.

The road from Louisville to Vincennes certainly does not present an attractive trip, the most disparaging feature between Louisville and French Lick being numerous water bars, but from that point to Loogootee the many rocky grades necessitate very slow travel, requiring about 2 hours to negotiate 24 miles. From Vincennes to St. Louis is a fair to good natural dirt road in dry weather over mostly level country, with a total mileage of about 280 miles.

Should you go via Indianapolis, which we think would be the better way, you will encounter much worn-out macadam on the first 30 miles, but after passing Underwood you will have fine gravel to Indianapolis, via Seymour, Columbus and Franklin. Good gravel or stone will be found as you proceed to Terre Haute via Plainfield and Brazil. Terre Haute to St. Louis is over natural dirt roads most of the way, passing through Martinsville, Effingham, Vandalia, Greenville, Highland and Collinsville.

For your journey to Chicago we would suggest leaving St. Louis via the Alton Way for Springfield, which takes you through Alton, Medora, Carlinville and Virden to Springfield; thence through Middletown, Delavan, Peoria, Chillicothe, Peru to Ottawa. This route takes you through the state reservations of Deer Park and Starved Rock, which are both scenic and historic. Leaving Ottawa, you will follow the beautiful Fox river valley through Danway, Newark, Yorkville and Montgomery to Aurora; from here to Chicago will be through Naperville, Downers Grove, Hinsdale and Forest Park, entering the city through Garfield park.

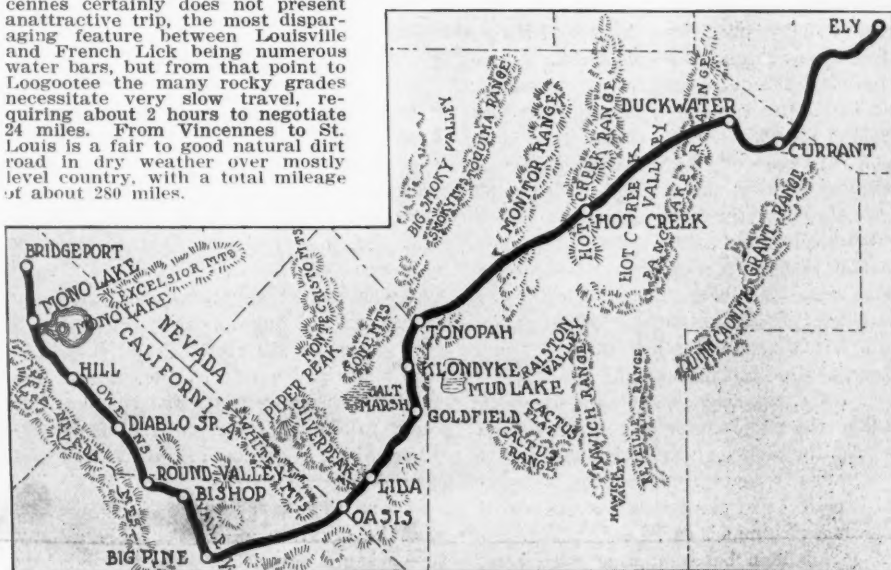
Returning to Indianapolis your route will be through Washington park and Bryn Mawr, South Chicago, Whiting, Highlands, Schererville, Crown Point, Thayer, Rensselaer, Remington, Wolcott, Montmorenci, Romney, Crawfordsville, Whitesville, New Ross, Jamestown, Pittsboro, Brownsburg, and from Indianapolis to Louisville the reverse of the route given in the outbound trip.

If you are not in possession of the Blue Book covering the Middle West, you will find that volume 4 will cover this trip with running directions and the consideration asked, \$2.50, is trivial in comparison with the assistance rendered. If you cannot secure this in Louisville, it may be obtained from the Automobile Blue Book Pub. Co., 910 Michigan avenue, Chicago.

Mazon, Ill.—Green Bay, Wis.

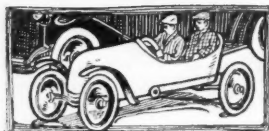
Mazon, Ill.—Editor Motor Age—I would like to know which is the best route to Green Bay, Wis., leading through the most scenic country. Will we encounter much sand or very hilly country?—Lester J. Worley.

Running north from Mazon to Morris, follow the regular route into Ottawa via Marselles, 25 m.; Ottawa to Rockford, 86 m., via Troy Grove, Mendota, Rochelle, Old Milford; Rockford to Lake Geneva, 53 m., via Belvidere, Chemung, Walworth; Lake Geneva to Fond du Lac, 95 m., via Elkhorn, Eagle, Oconomowoc, Iron Ridge, Mayville, Theresa; Fond du Lac to Green Bay, 63 m., via Brotherstown, Sherwood, Greenleaf. You will have gravel most of the way with the exception of the stretch from Mazon to Rockford, which is natural dirt road and usually good during the summer months. This route will take you through Lake Geneva with its beautiful summer residences and along the shore of Lake Winnebago, which is a picturesque drive, as well as other points of interest, which space will not permit us to designate.



ROUTE OF THE 2 DAYS' TRIP INTO WESTERN CALIFORNIA FROM ELY

This is through the heart of Nevada's gold and silver country over very easy roads and wonderful scenery



Cyclecar Development

The Reason for the Cyclecar

THE cyclecar in its present stage of development is the answer to the appeal of the public for a vehicle obtainable by the man of moderate means who cannot afford the upkeep of the modern car even of cheap price, a vehicle which will do much at little cost, and with great reliability.

The cyclecar breaks away from all horse tradition and the further limitations of motor car construction, and even offers a deft to road conditions, striking out in new lines, starting the development of a new vehicle, of new size and of the cheapest reliable construction which, in the end, through the numbers in use, will dictate its own road tracks and its road conditions, as does the wide-tread heavy car of today.

There have been two great stages in the development of the motor car since its emergence from the experimental stage, while the third stage is but just beginning; first, the big car; second, the small car, and finally the cyclecar.

Motor Vehicle Development

The first stage was the changing over of the horse vehicle to a motor vehicle. The first experimenting with motor vehicles was with small cars, but the buying public at that time consisted of the rich man and the rich man's sons. These did not want a toy, they wanted a full-sized vehicle, but driven by motor. The size must compare with horse rigs. The first cars were made horse-high, as buggies had been made for centuries, but while the height and tread of buggies were all right for horse speeds, the weight was too high for motor speeds, hence the car dropped lower, while keeping standard wide tread.

To meet the extra speeds extra strength had to be given to the motor car, and this brought up the weight so that even now some cars are carrying but two persons—weighing perhaps 300 pounds—weigh 3,000 pounds, or ten times the load. In motor truck development it has been found most efficient to have the weight of the vehicle about equal the load. For road efficiency the weight of the average motor car is too high. Thus was developed the first type of car, the big touring car, the heavy, high horsepower, expensive machine which well merited the name motor car. This vehicle was for the rich man and his family, and has gradually been perfected to mechanical excellence of the first order—but still remains a rich man's car.

The rich man once supplied with cars, the makers of the small-car type started to build in America, though abroad this field is even now but starting. In America, taking motor car practice and throwing

By William B. Stout

away horse size, but retaining horse width of tread through the demand of road conditions, the new makers built miniature replicas of motor cars with four-cylinder motors, three-speed gears, shaft drive and differential and in so doing partially reduced the cost of building. These small cars were made in great quantities and hence could be built cheaply.

As a result some twenty times more small cars were sold than big motor cars, for the smaller vehicles came more nearly to the demand and purse of the masses. This small-car stage which is now at or near its zenith of production is the second great stage of motor car development, and has resulted in a class of car which has reached to hundreds of thousands of buyers. These cars have sold in enormous quantities and have put up remarkable performances.

The third stage of development, which is destined to produce in the end a car which can be bought by the masses, a car that will sell in much greater quantities than the small-car type has reached and for very little money, is seen in the beginnings of the cyclecar movement.

There are hundreds of thousands of families waiting for a car they can afford and care for, unable to buy the cheapest vehicle now. It is only up to the ingenuity of the American engineer to meet the desire of these hosts in order to reap a large reward. The problem of a \$350 or even \$250 car that will carry two and be really reliable is not beyond solution. Such cars will be made and made soon—but these will not be copies of big cars, but new vehicles, of low upkeep.

Paying the Bills

If a man owns a big six-cylinder seven-passenger car of average make he must not only be a man who can afford to buy that car, but he must be of sufficient means to maintain it. He must be a man, too, who can at any time take out seven passengers and buy a meal en route or several meals for the crowd at an expensive road house and not feel the expense. The number of passengers carried by a car has much to do with the entertainment expense, which is greater often than the real car upkeep.

If a man has a car in the \$1,500 class he must be equal to a call for \$150 at any time when a new set of tires is needed or new transmission or differential. One hundred dollars, however, might be called an average maximum. With the cheap light car this cost comes down to perhaps \$50,

but a man with the cheapest type of car built on modern lines knows that there is danger of being called on for this expense at any time. This is too much for the average man to afford, to whom a \$10 bill is a large amount. Yet this man to whom \$10 is a real sum of money is as anxious to get out into the country, to travel apart and in any direction at will, and with his sweetheart or wife with him, as is the man who can own and pay for a six-cylinder car. He has \$300 or \$400 in the bank and a \$100-a-month job, but he cannot buy a small car, as he could not keep it up even if he bought it.

It is to this class that the cyclecar will appeal, and here it might be well to point out the real definition of the cyclecar as we see it in America.

England One of Pioneers

England, taking up the original cyclecar from France, became enthused with the cyclecar and started to make it. There were no small cars like our Hupmobile and Ford produced in England, and so with the cyclecar movement started a small-car movement such as we have had for years. This vehicle some of the American press has confused with the cyclecar, and the criticisms of the cyclecar movement appearing in some of our scientific papers have proceeded from ignorance in the difference between the English small-car movement and the cyclecar.

The small-car may be of the same size as the cyclecar with the same horsepower and yet they may be no more alike in theory than a wagon and a wheelbarrow. One is a small replica of a motor car—three-speed gear and reverse, shaft drive, bevel or worm to rear axle, differential, etc. Here in the transmission system are twelve to fifteen gears of expensive construction even if small, universal joints, floating rear axles, expanding brakes, clutch, etc., etc.—a miniature big car. Too often cheapness is had in these cars through workmanship being slighted, though that in America is happily not true.

The cyclecar starts out to be a small car, but admitting that it is to be small, the entire mechanical layout is set out not to copy anything other than good well-tried-out engineering practice, and to put this to use to produce the cheapest possible form of vehicle, body, motor, transmission, brakes, etc., that will do the work and do it well, reliability and long life being sought for just as much as with the small-car type. The cheapness is arrived at through refined design rather than by

slighting anything even of minor importance.

Thus a cyclecar is the simplest car possible. What will it be?

In the first place the vehicle must be light. It must have a small motor and yet to be popular must have speed. It must be comfortable even at speed. It must be easy to repair, that upkeep may be low, and parts must be obtainable anywhere that one may not be held up on the road in case of accident. It must carry one or two persons with enough room to spare so that baby can go along if necessary. More capacity would not be advisable.

In building this car one can draw on all engineering for his ideas, taking those fitted to his basic ideas and applying them. From aviation the engineer gets the basic principles of the importance of eliminating head-resistance and knows that if he makes a car of standard width the light small motor he must use will not drive the car against the wind, and will not allow the use of a windshield and other comforts. The car must be narrow.

From the motoreycle he gets a reliable air-cooled motor of great simplicity, low upkeep, economical in fuel, and light for its power. Here he also finds the chain drive which he uses to a countershaft supported on ball bearings. For the drive to the rear he uses motoreycle V belts, which type will drive without slipping both in winter and summer if the pulleys be large and well fitted.

Using Belt Drive

The drive is the smoothest known and efficient as years of motoreycle use has proved. The use of side belts enables the vehicle to be built low, so that a narrow tread can be used. This will in all probability be 36 inches for America for reasons given before, and since 90 per cent of the cyclecars announced for America so far are of that tread. With belts on the outside of the body the weight of passengers is low—even below the axles; and the car will be stable and safe at speeds. Motoreycle wheels with extra wide hubs can be used.

Thus is given a possible general layout of the car, and details can be worked out separate by individual makers as to change speed devices—which are made very successfully without gears—steering, etc., but those makers will do best who build the cheapest constructed design coupled with the best possible workmanship. This cannot be slighted.

But what will this car do? Can it be sold? Can it run on our country roads? Will so light a car be comfortable?

What the car will do will depend on the design, but abroad these cars with small motoreycle motors have done 59.6 miles an hour, and can make 50 miles an hour on the road. They climb hills which bring big cars down to low gear and open throttle, and go through sand and over mud where big cars cannot follow. To show the reliability a table is appended showing what a single-cylinder 3½-horse-

power cyclecar accomplished in the hands of an English commercial traveler, its daily mileage comparing well with that of big cars on the same roads. In a recent London-Edinburgh run of the English Cyclecar Club the winning machines were more of them of the home-made variety than of the small-car class, though the entries were about equal.

That these cars can be sold is certain so long as they can be sold for under \$400. The interest aroused in America already is remarkable and thousands are only awaiting the chance to actually see what the new cars will do in order to place orders. What they will do will be seen very soon, as many are being tried out, and transcontinental runs are sure to take place in the near future.

Making It Comfortable

Will the cyclecar be comfortable? Light cars have a hard time to hold the road at high speed. If a 900-pound car cannot hold the road at 30 miles, what can a 400-pound car do?

The matter of holding the road is one of low center of gravity and correct springing with a minimum of unsprung axle weight. In the cyclecar the weight is lower than on any car—even the underslung types—and these vehicles can take corners faster than motor cars. As to unsprung weight the body with fittings and passengers on the cyclecars will weigh about 400 pounds above the rear springs and some 80 to 90 below in wheels, etc., so that the ratio will be in a well designed cyclecar about 5 to 1; a figure not approached by the big car.

Can the new vehicles run on our country roads? With 36-inch tread they can take all average roads. However, there are enough thousands of miles of good roads, macadam and boulevards of all kinds leading into and out of all our big cities to support tens of thousands of these small cars for pleasure and business use in running back and forth. As these strike

out into the country from the cities they will make their own tracks so that the cyclecar will have its own ruts and routes on country roads as well as in cities. This is a question of growth which will come within a very few years.

The man with the 6-months-in-the-year motoreycle will exchange his mount for the year-around cyclecar, and take off his dirty oil-covered clothing and drive to town in his business suit as he would in a car.

One cannot inclose a motoreycle, fast though they may be, nor can one use it on roads slippery with mud or snow, nor in comfort in cold weather. The cyclecar with windshield and top always will be there for use, and happy the man who owns one.

A new set of tires will cost not so much as one tire on a big car, and a new car except motor and wheels can be had for the price of a small-car motor alone. The man with the \$10 bill can meet his car upkeep expenses every month, and take as long rides into the country as his neighbor with the limousine.

There is a real field for the cyclecar, and when it once gets a start there will be as much greater a number of sales of cyclecars over small cars, as there was greater sales of the small car over the big ones. There is room for a million cyclecars in America.

CHICAGO'S CYCLECAR RUN

Though the Chicago Motor Club's around-Lake-Michigan reliability has been called off on account of an insufficient number of big car entries, it has been practically decided that the cyclecar division will be run a month later, over a different route, in an exclusive cyclecar reliability run, the first official cyclecar contest in America. Cars entering will have to conform to the cyclecar definition limiting them to 661 pounds maximum weight, and 71 inches cylinder capacity. Many entries are promised for the run.

STATISTICS SHOWING CYCLECAR OPERATION IN ENGLAND

The tabulations below show the experiences of Harry Long, a commercial traveler of England using a single-cylinder 3½ horsepower cyclecar with belt drive in his regular work in all weathers. Though the records shown cover but 3,000 miles of the trip—the distance covered when this report was printed—word comes that Mr. Long completed the 5,000-mile run in the allotted 6 weeks without more serious trouble or delay than shown in the table, which is taken from the London Cyclecar.

Daily Mileage	Weather	Incidents	Total Mileage	Gasoline Used Gals.
120	Cold, but fine.....	None	120	
135	Cold, but fine.....	Plug sooted twice.....	255	
128	Cold, but fine.....	Plug sooted once.....	383	
120	Cold; showers	Brake cable broke.....	503	
152	Cold and damp.....	Exhaust union came loose three times.....	655	
167	Rainy	Petrol pipe broke; plug sooted once.....	822	12½
114	Cold, but fine.....	Union nut broke off exhaust pipe; new link inserted in high gear chain.....	936	
120	Rainy	None	1056	
70	Rain part of day.....	Plug sooted once.....	1126	
128	Rain part of day.....	Low gear clutch stuck once; plug sooted once.....	1254	
126	Showers all day.....	Plug sooted once.....	1380	10½
80	Showery	Exhaust union nut broke.....	1460	
154	Heavy rain all day.....	No trouble	1734	
120	Fine	No trouble	1734	
135	Fine	Puncture in offside rear tire.....	1869	
77	Fine and warm.....	Shortened belts by 1½ in.; engine cleaned.....	1946	
162	Fine morning, wet afternoon.....	No trouble	2108	12½
140	Rain all day.....	Brake out of order.....	2248	
114	Rain all day.....	No trouble	2362	
122	Heavy rain.....	Brake cable broke.....	2484	
110	.....	Throttle cable broke.....	2594	
115	.....	Lost two bolts on front axle.....	2709	9½
81	.....	No trouble	2790	



LOS ANGELES CYCLECAR CO.'S LATEST MODEL

The run will take in Chicago, Indianapolis and Detroit, the cyclecars making about 125 miles a day. A day's stop will be made at Indianapolis, with a hill-climb on the program; a day's stop will be made in Detroit, with a speed contest as the feature over a measured mile on a cement road, and on arrival at the end of the return journey the cars will be emptied of gasoline and each car given $\frac{1}{2}$ gallon of gasoline. A test will then be made to see which car can go the furthest on this amount of fuel. The winner probably will make 25 to 30 miles.

Thus in the one run the public will be acquainted with the possibilities of the cyclecar on reliability, in cross-country road work on all kinds of roads, on hill-climbing ability, on speed, and on efficiency and fuel economy.

The Imp Cyclecar Co., promises at least two cars for this event, the Booth Cyclecar, of Detroit, is promised, so are the Butler cyclecar, and the Mobilette, of Chicago, while the Downing-Detroit Co. and the Economy car Co., of Indianapolis, will in all probability be represented. Several other machines now undergoing tests will, it is hoped, be ready in time for this event. It is probable that there will be at least a half dozen actual starters. The run will start during the first week of October.

Co-operation on the part of the cyclecar enthusiasts in Indianapolis and Detroit will be sought to make the affair the success it ought to be.

THE DETROIT SITUATION

Judging from the rate at which new cyclecar concerns are bobbing up in Detroit, it will not be long before this country will be able to boast of more makers of the little vehicles than England, which is reported to have about 120 such concerns. But other than to state that they are working on their models, the makers on the whole will say but little about them yet. All are testing them out carefully and wisely, determining whether or

not their designs which are largely patterned after those made abroad are adaptable to American road conditions. There is little doubt of the success of the little cars upon the smooth pavements of our large cities, but were the makers to confine their selling field to these cities, it would be a limited one indeed. Realizing this, they are all seeking to make their cars as capable of negotiating average country roads as are their big brothers in the motor car field.

Among the latest to appear in the Detroit cyclecar list is the Davis Cyclecar Co., with William N. Davis as the designer. The car will be a tandem type, the steering being done from the rear seat. The power plant will be a Spacke motor of air-cooled type, while its power will pass through a three-speed gearset and thence by silent chain to the rear axle. The Davis machine weighs under 600 pounds, has a wheelbase of 93 inches and a tread of 36 inches. It will have wire wheels and in other respects will conform to cyclecar ideas.

The Davis company is being heavily financed, it is understood, and plans to manufacture several thousand cars during the 1914 season. The price to be asked for the car has not yet been decided, but it will be under \$400. Mr. Davis has had experience of value in this work while with the Hudson and Thomas concerns, and later with the Murphy-Potter Co., of this city.

It is probable that the manufacturing of the cyclecar brought out by the American Cyclecar Co. will be carried on in the east, according to officers of the concern. It is owned by the Connecticut Electric Mfg. Co., Bridgeport, Conn., and this company is disposed to carry on manufacturing operations at its own plant. As will be remembered, the American Cyclecar Co. was incorporated in Michigan some time ago with a comparatively small capital, but since its acquisition by the Connecticut company, this has jumped to \$200,000 and the

manufacturing plans contemplate a 10,000-car output for the coming year. The car is to sell for \$390 with equipment.

Reports have it that H. D. W. Mackaye has severed his connection with the Keeton Motor Co. to engage in the manufacture of a small car on a large scale, though it is not known whether this is to be built along cyclecar lines or to conform to standard motor car practice. The price is to be in the neighborhood of \$500. The car is to have a four-cylinder motor, three-speed gearset, 100-inch wheelbase and it will be built with two body types—a four-passenger and a roadster. Mr. Mackaye is said to have capital associated with him in the project which will bring the total paid in to \$300,000. The capital stock will be over a million, if present plans materialize. As yet the concern has not been named.

The Saxon Motor Car Co. is another concern in the small-car field, H. M. Weirth, located at 2609 East Jefferson avenue, being its representative so far as the public is concerned at present. No details of the car or its maker are as yet forthcoming, but these will no doubt be divulged within a short time.

FALCON A NEW CYCLECAR

Francis R. Hoyt, of Cleveland, O., who has been working on the cyclecar idea for some time, has announced the new machine which is to be manufactured by the Falcon Cyclecar Co., which is temporarily located at 2344 East One Hundred and Fifth street, this city. The company will be incorporated for \$250,000. The permanent plant probably will be erected on the same street, between Quincy and Quebec. Parts for 2,500 cyclecars have been ordered and the name Falcon adopted.

The wheelbase of the Falcon is 96 inches and the tread 36. The wheels are 28 by 3. The motor is a two-cylinder air-cooled with a piston displacement of 70 cubic inches and a rated horsepower of 10. There is an electric lighting and ignition system. Other features are final drive by means of $1\frac{1}{2}$ -inch V belt, friction transmission, left drive, center control and automatic starter, operated from the seat. The weight of the car is 325 pounds and the tanks have a capacity for 9 gallons of gasoline and 1 gallon of oil. The two-passenger body has the seats side by side. The list price is \$385.

Probably the three most unique features of this new construction are, first, the method of speed-changing or gear-shifting, which is accomplished by a second or auxiliary wheel shown in the illustration within the outer or steering wheel, thus allowing the driver to vary the speeds of his car at will, obviating the necessity of leaning forward and fussing with a gearshift lever. Patents have been applied for this mechanism as well as the second and third features. The second feature provides automatic electric lighting and ignition, permitting the car to be started or cranked from the seat. The third feature constitutes the front spring suspension, the front

springs being so designed on a pivotal principle that road shocks are not communicated from the wheels to the body.

CALIFORNIA CYCLECAR

The Los Angeles Cyclecar Co. has been incorporated under the laws of Arizona to manufacture what has been known as the California cyclecar, the design of L. E. French, of Los Angeles. The company is capitalized at \$150,000 and has acquired a factory site of 16 acres near Los Angeles.

The California cyclecar was one of the first to be built in America since the recent movement started, and is shown in its latest form in the illustration with the designer at the wheel. The machine, as noted, is of the side-by-side seating type, with underslung frame, boat type body,

final belt drive, and is in every sense a cyclecar.

The motor is a 10-horsepower twin, with a bore of 3 $\frac{1}{8}$ and a stroke of 3 $\frac{3}{8}$ inches, the displacement being within the limit of 70 inches. The valves are both mechanically operated, and a fan is fitted to the motor to assist in cooling should this be necessary on hot days.

The gearchange is obtained by friction disks giving four speeds forward and reverse, while two 1 $\frac{1}{4}$ -inch V belts take the power from the jackshaft to the rear wheels. A side lever tightens the belts from the seat by shifting the rear axle, and no differential is fitted, as this fitment is unnecessary when belt drive is used.

Control is by foot clutch and brake

levers, and a side lever for gear change. The belt-tightening lever also works the emergency brake. Spark and throttle levers are fitted on the steering post.

The frame is of angle iron reinforced with wood, and 9 inches ground clearance is allowed. The wheelbase of the car is 102 inches, and the tread 44 inches. The car is sold with lamps and horn, tire outfit and tool kit for \$395 f. o. b. Los Angeles.

The firm is planning also to put out a small car on the same general lines, but fitted with a four-cylinder motor, 2 $\frac{1}{2}$ by 3 $\frac{1}{2}$ inches, and final chain drive from countershaft to rear wheels, a friction differential being fitted. The wheelbase, tread, etc., will be the same, but the fittings more complete. This car will sell for \$475.

Answers to Inquiries Concerning Cyclecar Construction

RUNNING BOARDS LEVEL WITH TOP

Reader Makes Good Suggestion to American Cyclecar Makers

MILTON JUNCTION, WIS.—Editor Motor Age—In your August 7 issue I notice that on the 90-degree motor you have both connecting rods on one crankpin. Why not have two cranks set at 90 degrees? This would give explosions as even as the 180-degree motor and should be very easy to balance.

2—In cyclecar designs the running boards are quite low and the bodies are without doors. Why not have the running boards level with the top of the body, say 28 inches from the ground? This would be consistent with the cyclecar idea it seems to me. Why not sit down on this 28-inch high running board and swing your feet over into the car instead of climbing over the side?

3—Why not have the fenders bolted to the body at this height with only a small raise over the wheels?

1—The 90-degree feature is adopted in cyclecar motors to obtain better running balance, for when the pistons and connecting-rods come at right angles, a counterweight equaling the rotating weight of one set will almost perfectly balance the motor so far as weights go. The firing is, of course, uneven. The arrangement you suggest would cost more to construct, and give even firing, but poorer balance, more weight, on account of the offset cylinders, and would be a departure from standard. A twin vertical would give about the same results. The torque in your motor would be more even, which would be an advantage, but in a machine as light as a cyclecar, where motors run at a fairly high speed, the balancing of running parts is of more importance.

2—This is a very good idea well worth trying, though we know of one machine now built embodying a similar idea in a narrow ledge about the body, integral with the fenders at the back. One can sit on this ledge and swing the feet in. This saves stepping over a 10-inch side.

3—With the scheme you mention this would be very feasible.

American Cyclecar Makers

New Britain, Conn.—Editor Motor Age—Will you kindly furnish me with the names of some cyclecar makers in America. I would appreciate any literature you may be able to send or refer me to in regard to cyclecars. I

am not a manufacturer or dealer but wish to investigate with the idea of a purchase.—C. G. B.

No American cyclecar company is as yet ready to give immediate delivery on a machine, nor will be in all probability for several months. Every American machine is in the experimental stage, though several are fast emerging. Once started it is probable that America will produce better cyclecars than Europe, for American conditions demand greater simplicity and low cost. Meanwhile write the following firms for information such as you desire:

Blood Bros., Kalamazoo, Mich.
California Cyclecar Co., Los Angeles, Cal.
De Cross CyCar Co., Gahlow and C. H. & D. Railway, Cincinnati, Ohio.
Downing-Detroit Motor Co., Detroit, Mich.
The Economycar Co., Indianapolis, Ind.
F. R. Hoyt, Cleveland, Ohio.
The Imp Cyclecar Co., Auburn, Ind.
Woods' Motorette Co., 189 West Madison street, Chicago.

Cyclecar Plans Not Available

Philadelphia, Pa.—I note in Motor Age a number of serials and stories, and many suggestions to your readers relative to the construction of the new cyclecars. Is there any way in which I could get a set of plans for the building of one of these machines?—H. S. Myers.

There is no way Motor Age knows of to get a set of complete plans for a cyclecar, for this is an engineer's job and worth considerable money. However, if you make your own layout and plans any questions and answers would be answered through this department, which aims to give all the assistance possible to the new motor-ing and its enthusiasts, whether manufacturers, dealers or experimenters.

THREE AND FOUR-WHEELED CARS

Former Costs Less to Manufacture—Not Good for Rough Roads

Huntsville, Ala.—Editor Motor Age—Was the Kelsey motorette taken off the market because a three-wheeled machine proved impracticable?

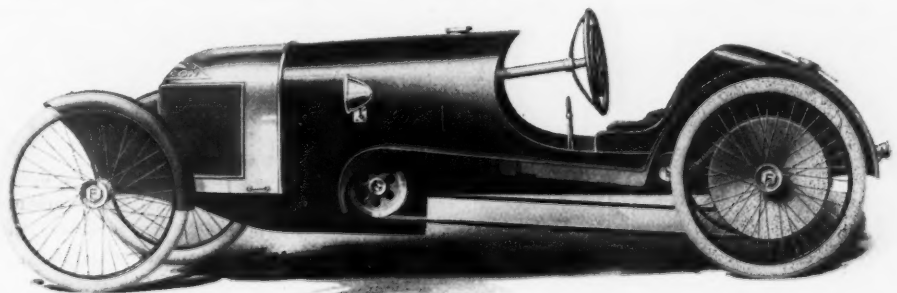
2—Does the American Coates or the foreign Morgan tri-car have springs over the rear wheels, and what type are they?

3—Can three-wheeled machines operate on less power than four-wheeled on account of having no differential? Are tri-cars being successfully used in the United States?—S. P. M.

1—The reasons for the withdrawal of the Kelsey Motorette were chiefly business reasons.

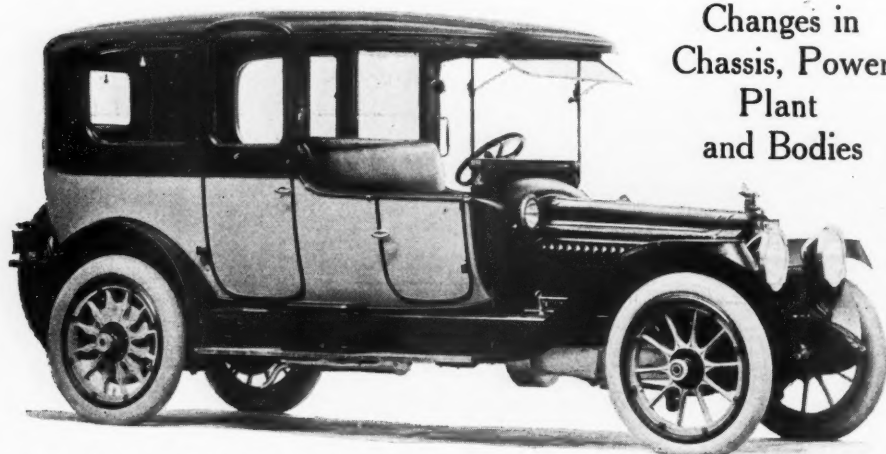
2—Yes. These are of the quarter elliptic type with radius rods, what is ordinarily called the Lanchester type of suspension.

3—No. The differential does not make the difference. The roads make the four-wheeler consume less power since one wheel does not of necessity run in the bumps and take every hole in the road. With the three-wheeler it takes careful steering to keep from hitting every bump in the road. There is less manufacturing cost in a three-wheeler, but this in practice is more than made up for in added sales cost. Also the tire wear is greater on a three-wheeler and the difficulty of repairing a rear tire may be imagined. Many tri-cars in delivery work in cities are giving good satisfaction. Motocycles with sidecars are in use in large numbers but are not generally considered a very great success on rough country roads.



FALCON CYCLECAR. DESIGNED BY F. R. HOYT

Packard 38 Appears in Its 1914 Dress



NEW PACKARD 38 TOURING CHASSIS WITH SEVEN-PASSENGER STANDARD LIMOUSINE BODY WITHOUT CAB SIDES

WITH a number of minor refinements in the chassis, power plant and bodies, together with several alterations which cannot be put in this minor class, the Packard company announces its smaller six, model 38, for 1914. This car, now in its second year, still retains its distinctive Packard appearance throughout, and in its main scheme of design does not depart from the principles long looked upon as characteristic of cars of this make.

The motor and clutch are carried as a unit, while another unit is made of the rear axle and gearset; the control board on the steering column remains unaltered; left drive and control are continued.

Uniform Wheelbase Adopted

The wheelbase has been made the same for all models. It measures 140 inches, a slight increase over last year's phaeton and touring car, which were 138 and 134 inches, respectively. The roadster receives the greatest lengthening out, its chassis formerly 115½ inches between hub centers. On this new 38 chassis, nineteen body-types of all conceivable designs are fitted. The prices have also undergone a cut, the touring car now being offered at \$3,850 with standard body, while last year it commanded \$300 more. Corresponding reductions have been made in other models. For 1914, too, the chassis may be had separately, if desired, so that any special body may be fitted. For the chassis alone, the price is set at \$3,100.

But it is in the power plant that the greatest changes have been made. Al-

though still a 4 by 5½-inch motor, the new edition bears little or no resemblance to its predecessor. The horsepower rating is 38 according to the penurious S. A. E. formula, but on the block the motor has delivered 60 horsepower at a crankshaft speed of 1,800 revolutions per minute according to the engineers.

Motor Changes Numerous

The cylinders are cast in blocks of three instead of in pairs as last year. Throughout the new design, simplicity of appearance is very marked, the three-cylinder blocks aiding this impression by their smooth lines and compactness. Absence of long manifolds, exposed wiring and oil piping also augment this appearance, a further smoothing out touch being given by the enclosing of the valves and tappets within cover plates in the usual manner.

The cylinders are of the L-head type with the valves all on the right. The exhaust manifold connects on this side, while the intake is on the opposite side, and due to this position opposite to the valve pockets, obviously some method of conducting the gas across to the valve is necessary. Last year's model also carried its manifold on the left side, and the manifold was split into three sections, each passing between two of the pairs of cylinders to the right side. However, the 1914 motor carries its gas across through the waterjacket space instead of having external passages. Thus the manifold connections, which are four in number, simply bolt to the left side of the cylinder castings, and from

PACKARD 38 FEATURES

MOTOR

Oiling system changed; all piping within crankcase—camshaft drilled to carry oil.

Siamese exhaust manifold; separate passage for each three cylinders.

Mud-proof motor.

Cylinders cast in threes.

All ignition wiring inclosed within a compartment in unit with the water outlet manifold; no wiring exposed.

Radiator braced from top of water outlet manifold.

Bosch Duplex ignition system.

Bijur electric lighting and cranking system; motor and generator separate.

CHASSIS

Worm bevel axle driving gears. Wheelbase increased to 140 inches on all models.

Rear springs slung under axle. Brake drums increased to 17 inches diameter.

New gearshift, 8 inches further forward to allow left side entrance to car; throw of levers reduced.

New clutch brake; plate instead of band.

Rear axle housing of pressed steel and webbed; reduces size; shape altered.

Brake cross shafts mounted on axle housing instead of forward on the frame.

Brake rods within chassis instead of running along the frame outside.

Gasoline pressure pump on steering column instead of on seat.

BODIES

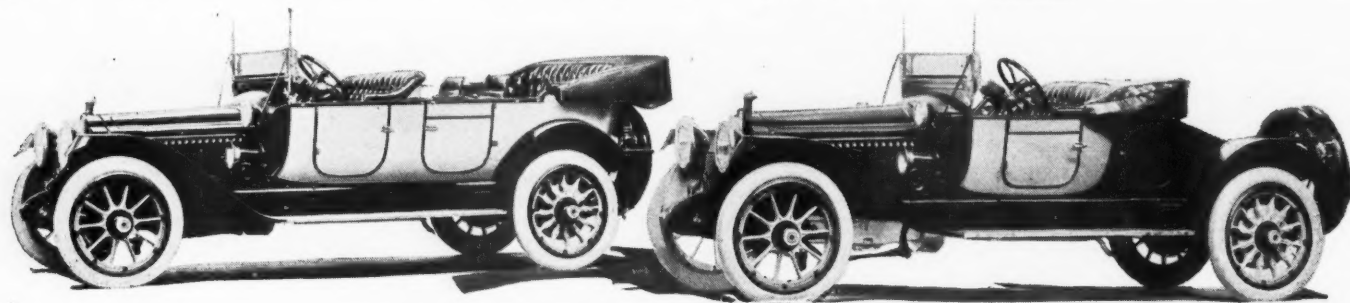
Front door on drive side.

Tapering hood and cowl to conform.

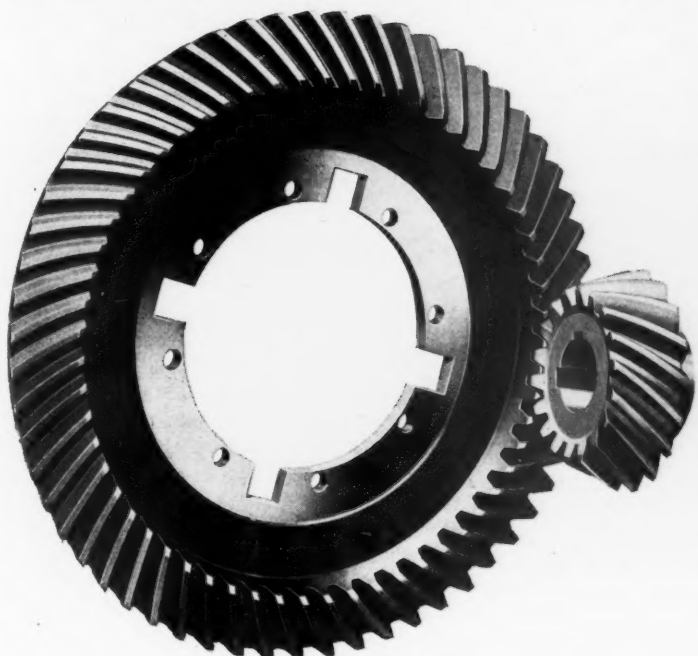
Price reductions; chassis offered separately if desired.

Touring car of sedan type offered.

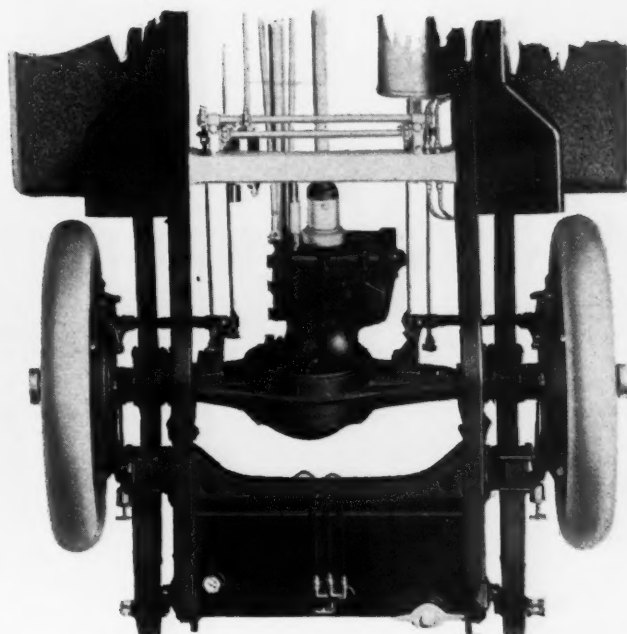
Tires carried at rear on all models.



SEVEN-PASSENGER PACKARD 38 TOURING CAR AND CHASSIS WITH RUNABOUT BODY



WORM BEVEL AXLE DRIVING GEARS



NEW AXLE HOUSING IS OF PRESSED STEEL

these connecting points it is distributed to the intake ports.

The inlet manifold itself is of new design, having a straight, horizontal main section from which the cylinder connections pass, and a short section at right angles connecting with the carbureter. It is waterjacketed in very neat fashion along its horizontal length—a new feature in manifold design. This waterjacketing should greatly facilitate vaporization in cold weather. Further warming of the incoming fuel is also accomplished by the passing of the gas through the water jacket spaces in the cylinders after it leaves the manifold. The hot water is piped to the manifold through brass tubes connecting with the jacket space of the first block of cylinders at the top. Another tube carries the water back to the lower part of the jacket of the same cylinder block. The water may be prevented from entering the manifold jacket by cocks provided on the supply tubes when a cooler intake is desired.

Siamese Exhaust Heads

The exhaust manifold, also new, really is a double exhaust type, known as the Siamese arrangement, in that each block of three cylinders has a separate passage. Although that for the rear block is cast integrally with the front header, there is no connection between the two as far back as the flange where the exhaust pipe joins on. With the ordinary type of exhaust manifold for six-cylinders, a back pressure due to the overlapping of the exhausts is produced. This two-part manifold, together with the two-block cylinder castings, is said to eliminate completely the back pressure.

Seven main bearings carry the crankshaft as heretofore, which makes for great rigidity and absence of vibration. There is a short bearing between each two cylinders, the end bearings being of much

greater length. The pistons are each provided with four eccentric piston rings, while straight spiral springs operate the valves. The adjustable tappets are held down by dogs for easy removal, each dog clamping the inlet and exhaust tappets of one cylinder. This dog has a single holding bolt at its center.

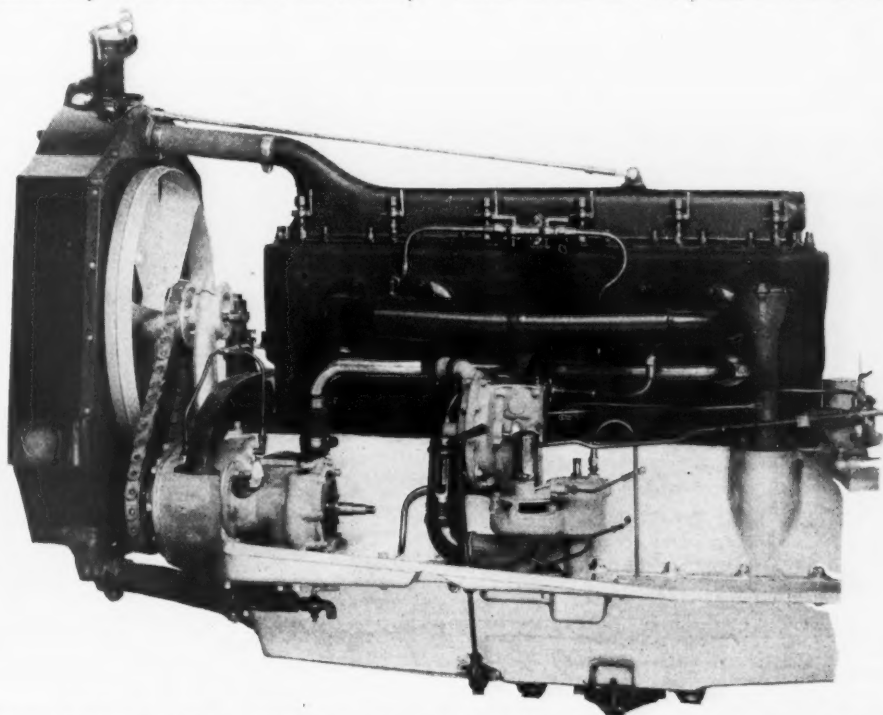
Packard Lubrication

Lubrication is by force fed from a gear-driven pump located in the crankcase, the system being similar in design to that used in last year's models, having a main oil manifold for ordinary running, and auxiliary oil leads direct to the cylinder walls governed by the throttle and operated automatically when the motor is under heavy

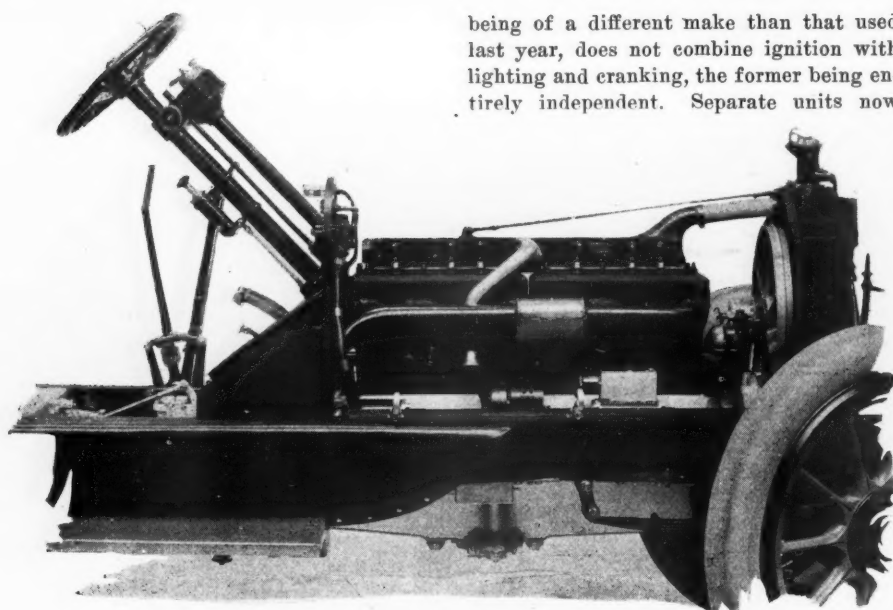
load. But instead of a pipe acting as the main oil manifold, the camshaft is drilled and acts in this capacity, eliminating practically all external oil leads from the new motor.

Camshaft Is Oil Manifold

After being strained, the oil is sent by the pump through an external pipe—the only outside tube in the main system—up to another strainer mounted at the forward end of the motor. It then runs down to the camshaft through an internal passage within that part of the forward end of the crankcase which forms the rear of the timing gear housing. Holes drilled in the bearings communicate with the hollow center of the camshaft, and as the latter



LEFT SIDE OF MOTOR, SHOWING NEW FORM OF INTAKE MANIFOLD WATERJACKET; ALSO CARBURETER AND WATER PUMP. NOTE BRACING OF RADIATOR ON TOP OF WATER OUTLET LEADER, MAKING RADIATOR A UNIT WITH CHASSIS



RIGHT FRONT SIDE OF NEW PACKARD 38 CHASSIS

revolves, these register with the main lead just mentioned, making a passage to the inside of the camshaft. The same registering scheme allows the oil to escape to the other bearings. Leads in the crankcase web carry the oil down to the crankshaft bearings, and thence through leads it is led down to the connecting rod bearings. The connecting rods also are drilled and from here the oil is led to the piston pin bearings through the rods. Overflow from the piston pin bearings and the spray from the lower connecting rod bearings lubricate the cylinder walls, except under heavy load, when the auxiliary system is also brought into play as already mentioned. In the Packard 38 motor, there are thirty-five bearings lubricated directly by the force-feed system.

The Mud-Proof Motor

A new feature is the casting of webs on either side of the upper half of the crankcase, which, when the motor is mounted in position, extend to the frame rails and exclude all mud or water which might splash up. This construction has given rise to the term mud-proof as applying to the new motor. On these webs the electric units, carburetor and water pump are readily mounted with full protection.

The motor is suspended in the regular Packard manner by means of integral crankcase arms at the rear end which bolt to the frame, and the slinging of the forward end from an arched I-beam cross member which passes over the crankcase between the front of the forward cylinder block and the timing gear housing.

A radical change has been made in the electrical system of the new Packard, which besides

being of a different make than that used last year, does not combine ignition with lighting and cranking, the former being entirely independent. Separate units now

care for the cranking and lighting functions, these being a Bijur generator and motor.

Both the generator and motor are mounted on the right side of the power plant. The cranking motor temporarily gears to the flywheel to turn the crankshaft for starting and therefore is placed at the right rear side. The generator is at the front and its shaft is driven by the timing gears. Back of the generator and on the same shaft is the magneto, so that the latter occupies a central position between motor and generator.

The Bijur system combines a storage battery with the main electrical units for the purpose of storing surplus energy generated to be later given out when the demand is greater than the generator supply, for lighting the lights at night when the engine is not running, and for supplying the electric cranking motor. To start the engine the operator pushes down on a

heel button. First pressure on this starts the electric motor slowly to facilitate the meshing of the gears between it and the flywheel which the same pressure also takes care of and further downward pressure sends additional current to drive the motor at a great enough speed to crank the engine on the magneto.

The Bosch duplex ignition system with a single set of spark plugs is employed. In this system the high-tension duplex magneto sends the secondary current direct to the plugs. There is no ignition wiring exposed, a new and distinctive feature being the inclosing of all wiring within a conduit which is integral with the water outlet manifold at the top of the cylinders as shown in the illustrations. Small plates on the side of this conduit allow of access to the wiring if necessary. The spark-plug knife switches, which have long been a Packard feature, are carried by this conduit. To make contact with a spark-plug, it is only necessary to bring the knife switch down onto the plug connection. From this wiring conduit the wires are carried down to the magneto in a tube which terminates just above the former. A rubber boot slips over this tube end and covers the wires running to the magneto.

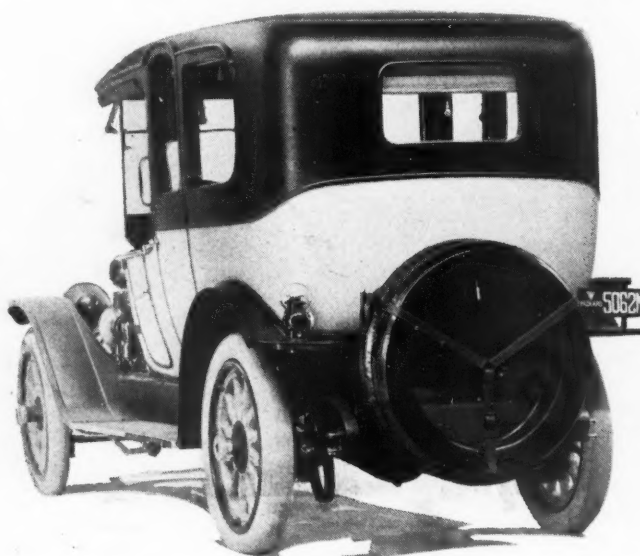
New Type of Clutch Brake

The multiple-disk clutch is housed in unit with the crankcase, its cover bolting to the latter. A new feature of this clutch system is the substitution of a plate clutch-brake for the contracting band type formerly used. The new construction embodies a circular plate lined with a friction material, which plate, through its interconnection with the clutch pedal, moves horizontally against a collar on the transmission shaft to stop the spinning of the latter when the clutch is released so as to facilitate gear changes. This plate is similar to the disks of the clutch in its action.

The intermediary between motor and rear system is the regular type of Packard propeller shaft. It is uninclosed and is fitted with universal joints at either end. A triangular torque arm parallels the shaft and takes the driving strain.

A very notable difference in the rear system is the adoption of a pressed steel rear axle housing to replace the aluminum type used on all Packards up to this time. The new steel housing is flanged top and bottom to aid in strengthening. The gear-set housing, however, is still made of aluminum. The weight of the axle remains practically the same with this new steel construction, but the size is reduced, made possible by the use of the stronger material.

Another feature new to Packard construction is the underslinging of the three-quarter



REAR VIEW OF PACKARD LIMOUSINE. SHOWING CURVED BACK AND ROUNDED ROOF

elliptic rear springs which allows the lowering of the frame somewhat without altering the road clearance, thus making for greater stability. The front springs are mounted over the axle. Brake drums have also come in for some of the changing, their diameter being increased to 17 inches in the new six.

Another alteration worthy of note is the bringing of the brake rods within the frame, that is, they run back from the equalizers to the rear axle within the frame instead of paralleling it along the outside as heretofore. The brake shafts have also been mounted on the axle housing, their former position being further forward and on the frame.

The new type of worm-bevel gearing used in the rear axle is a Packard development which is new to gear manufacture. The large bevel ring gear and the mating driving pinion on the drive shaft have teeth with bevel faces, as in the ordinary gears of this type, but instead of being straight, the teeth have a curve like those of a worm gear. This construction was described in the August 14 issue of *Motor Age* and is a construction which has been used in all Packard rear axles for some time. This gearing is the result of much experimentation on the part of the Packard engineers in an endeavor to produce a noiseless construction, and the form of the teeth produces a longer contact which does away with back-lash which causes most of the noise in straight-teeth gears. By affording this more continuous contact between the engaging teeth, a smooth, sliding action between gear and pinion results.

The gear shift on the new Packard is of less lever throw. Both the brake and gearshift levers have been moved 8 inches forward from their previous position, allowing a door to be put on the drive side. The steering column now also carries the hand gasoline pressure pump.

In line with the general tendency, the new Packard hood slopes slightly from the cowl down to the radiator, while the cowl itself rounds into the body. Tires this year will be carried at the rear on all models, leaving clear entrance to the drive side through a wide door.

New Body Features

The phaeton and runabout bodies fit the phaeton chassis, so called, which is the same as the touring chassis except for the rake of the steering post and for other alterations made necessary for the accommodation of the different bodies. One new model is an open sedan type, which has two forward separate seats with a passage between them into the tonneau. Externally this looks very much like the touring body. A special touring body for six is offered in addition to the standard Packard line. This is a cheaper type, affording all of the Packard features at a price \$500 under that of the regular touring body.

The open bodies have a one-man top, so-called, which can be handled by one



WINDOW REGULATOR AND FOLDING SEATS OF NEW PACKARD LIMOUSINE

person without leaving the car. Both tonneau doors and the touring and phaeton bodies are fitted with an attachment which allows the side curtains to open with the doors when these curtains are in position. For the ventilation of the front compartment a shutter extending along the lower edge of the windshield is fitted. This may be closed by a handle in the center.

Inclosed bodies of all types are offered, the limousines and landaulets all fitting the touring chassis, while the brougham and coupe types take the phaeton chassis. While the seven-passenger inclosed bodies retain the curved back, arched doorway and rounded roof, the six-passenger types have square corners at the rear and the low roof. Window regulators replace the straps on all inclosed car windows for raising and lowering them.

NEW MODELS ANNOUNCED

Detroit, Mich., Sept. 8—The Paige-Detroit Motor Car Co. enters the 1914 season with its same two representatives, models 36 and 25, both with four-cylinder, block-cast motors. The changes made are principally in the nature of refinements and do not affect the important features of

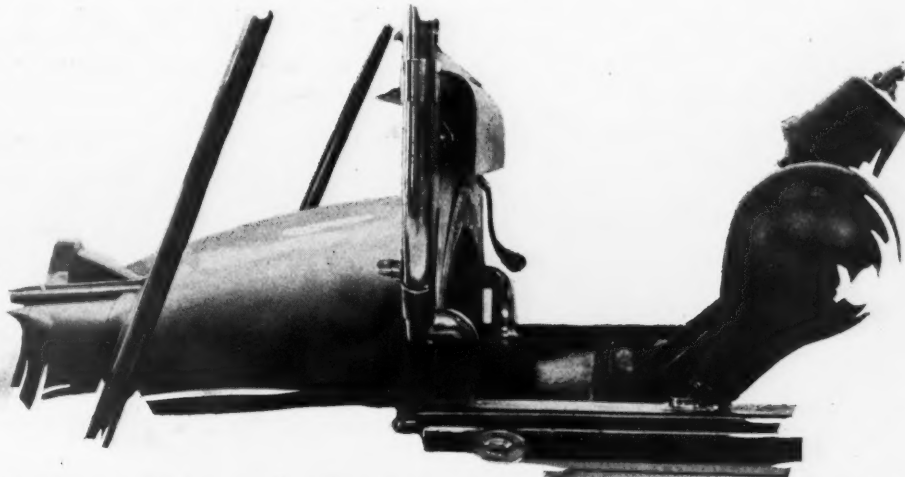
the cars at all. The type 36, which is offered for \$1,275 with full equipment, including a Gray & Davis two-unit electric cranking and lighting system, has a 4 by 5-inch motor, L-head design. The gearset is in unit with the crankcase making a unit power plant construction.

For the 1914 season, this larger car—the feature of the line—is built in five models, all on the 116-inch wheelbase. These consist of the usual array of open and closed types. Like the model 36, the 25 has an L-head motor and the unit power plant feature. This motor has a 3¾-inch bore and its stroke is 4 inches. The wheelbase is 110 inches, and on this chassis a five-passenger body only is offered. The price is \$950, electric cranking and lighting being added for \$75 extra. The equipment is complete.

For 1914, the Buick name will be borne by a six-cylinder machine as well as by a line of fours which with considerable alteration supersede those of last season. The new six retains the characteristic Buick overhead valve motor, the bore being 3¾ inches and the stroke 5 inches. With this long-stroke power plant, brake tests are said to show that the car possesses 48 horsepower. The adjustable pushrods are of the ball type and work in felt-socketed rocker arms.

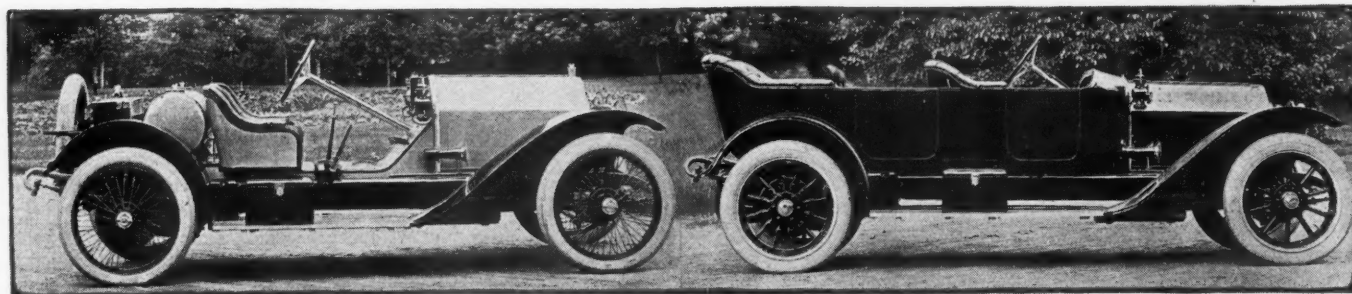
All 1914 Buicks are controlled by a single lever, operating on a ball and socket joint. There are no sectors or projecting parts to give a maximum of leg room and reduce all chances of soiling or tearing garments to a minimum.

This car as well as all of the fours is equipped with a Deleo combination ignition, cranking and lighting system. It has a wheelbase of 130 inches and there are two body types—a five-passenger touring car and a roadster. Left drive and center control are used. The bodies are in accordance with the latest dictates of body fashions, full curved rear fenders, clean running boards, smooth-sided design with concealed door hinges and handles, sloping hood and cowl shaped to meet it being among the features. The price of this model B55, as the new Buick is designated, is \$1,985.



SHOWING SHUTTER ALONG LOWER EDGE OF WINDSHIELD FOR VENTILATING PURPOSES. ALSO SHOWING HOW COWL ROUNDS INTO THE HOOD

New Stutz Six Motor Under Four-Cylinder Hood



TWO STUTZ 1914 PRODUCTIONS—THE RACY BEARCAT AND THE SIX-PASSENGER TOURING CAR
These illustrate both four-cylinder and six-cylinder cars for either the four or six motor fit under same length of hood

NOW that the eye of the motoring public is resting on the Stutz after its signal victory in winning the Elgin National trophy at Elgin 2 weeks ago, it is timely to tell what this Indianapolis concern has in store in the way of new models for the coming season. The 1914 line of Stutz cars is to be known as the series E—this year's was series B. The two chassis for the new year are to be the E 4 and the E 6.

Paradoxical as it may seem, there is really only one chassis, though both four-cylinder and six-cylinder cars are to be produced. The new six-cylinder motor and the new four-cylinder motor are interchangeable, insofar as that they go under the same length hood, and aside from the motors, the four-cylinder cars and the six-cylinder cars are practically identical. The chassis are equipped with the same bodies whether the motor be the four or the six.

Four Bodies and Two Motors

Four bodies are fitted to either the six-cylinder or the four-cylinder models—two two-passenger bodies, the one a roadster and the other a racy creation known as the bearcat, and both on a 120-inch wheelbase. The third body is a six-passenger touring car on a 130-inch wheelbase, and the fourth a coupe on the roadster chassis.

Aside from the motors there has been little change in the cars except the abandonment of the disk clutch for the cone type. Naturally, the Stutz combined gearset and rear axle have been retained.

Accomplishment of the feat of putting a six-cylinder motor under the same length of hood as the four has been made possible by casting the cylinders in sets of three instead of in pairs, as was done in the 1913 sixes. Not only does this give compactness, hence a more rigid and stronger construction, but it simplifies the carburetion problem by having only two inlet holes in the motor.

The new six-cylinder motor is a little smaller than the original six which appeared last February. The new motor has a bore of 4 inches while the older one was 4¼ inches in cylinder diameter. The stroke, however, is the same—5 inches. The cylinders are of the T-head type as

1914 STUTZ FEATURES

New six-cylinder motor

Six motor fits under same length hood as four

Clutch changed from disk to cone type

Waterjacketed intake manifold

Wire wheels optional

T-head motor, four cast in pairs and six in threes

Stutz combined gearset and rear axle

in former Stutz practice, and are offset ¾ inch, which is unusual in a T-head motor. The four-cylinder motor has the same dimensions as the older four, 4¼ by 5½.

Motor Details

In the details of construction the four and the six are very much alike and these can be understood by a consideration of the four in detail first. Its bore of 4¼ inches gives the motor an S. A. E. rating of 36.1 horsepower, but factory block tests show over 60 horsepower at 1,500 revolutions per minute crankshaft speed. The cylinders are offset ¾ inch, which is quite unusual in T-head motors.

The cylinders are cast in pairs and are of close-grain gray iron. Valve chambers, waterjackets and cylinder heads are cast integral and the top plate is of bronze. The pistons are fitted with four rings and have four oil grooves to assist in the distribution of the oil on the cylinder surfaces.

Wrist pins are hollow and are of hard-

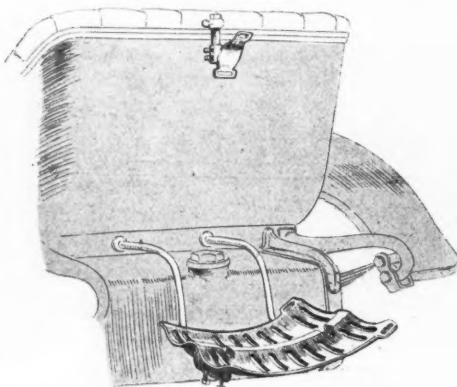
ened tool steel ground to fit. A feature that makes for easy maintenance is the use of adjustable connecting rod bushings fastened with four through bolts. Forty-point carbon steel forms the 2-inch crankshaft which is supported on three white-bronze bearings. The camshafts are of the same steel alloy as the crankshaft and run in large bronze bearings.

Unique Valve Inclosure

The pushrods have roller wearing ends and are of tool steel and each has a case-hardened screw which gives the tappet adjustment. A unique feature of the motor is the method of enclosing the valve-operating mechanism. Each pushrod with its valve spring is inclosed separately by an aluminum housing split in the center and held in place by means of a spring so that the housing can be removed in an instant. The valves have nickel-steel heads and are 2½ inches in diameter. The crankcase is aluminum and the upper half supports the crankshaft bearings with webs which extend through the entire depth of the case to insure rigidity.

Lubrication of the motor is by means of pressure feed of oil through a hollow crankshaft. The oil is pumped from a reservoir in the crankcase to ducts leading to each crankshaft bearing, thence through the hollow crankshaft to each connecting rod bearing. The upper ends of the connecting rods and the cylinders are oiled by crankcase splash, a glass gauge on the top of the crankcase shows the amount of oil in the reservoir.

The electric cranking system consists of a separate motor and generator system designed by Harry Stutz and built by the Remy company. The electric generator is mounted upon the left side of the engine and is driven from the pumpshaft. The motor is mounted on the right side of the engine upon the rear supporting arm of the engine which forms the housing for the reduction gear to the flywheel. The system is a 6-volt design and the units are all inclosed and are ball bearing. The cranking motor is of the series type and is capable of turning the engine from 75 to 120 r. p. m. The torque of the starting motor is 40 pounds. The switch is mounted in a direct line with the motor and at the



REAR OF STUTZ TOURING CAR
Showing arrangement for carrying spare tires

rear of the engine arm on the frame side member so that a push on the pedal moves a single rod which throws the switch and shifts the gear simultaneously.

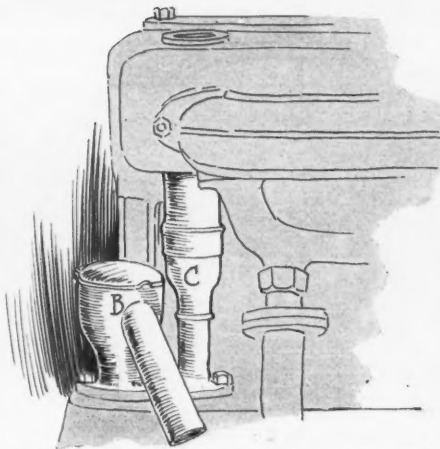
The cooling system includes a centrifugal water pump, a honeycomb radiator, mounted on trunions and a special fan of very solid construction. A fan adjustment is provided by mounting the bracket so it may be moved sidewise on its base, thus varying the distance between pulleys. Carburetion features include a Stromberg carburetor with a modified ram's horn type of intake manifold, the latter shows a divergence from last year's practice in that it is of cast aluminum instead of brass, and is waterjacketed, the latter connecting directly with the cylinder jackets.

Breather Directs Oil Downward

A new feature as applied to the touring cars is the use of a pressure gasoline feed to the carburetor from the tank at the rear. Another one of the new features is the combination breather pipe and oil filler in which the air from the breather is directed downward instead of allowing it to be sprayed promiscuously about the engine from horizontal openings. Timing gears have spiral teeth to reduce noise. Instead of the conventional underpan beneath the motor employed in the earlier models, the engine base is carried clear across the frame, and there are ventilators on each side in the hood to give air circulation. The elimination of the underpan provides greater accessibility to the connecting rods because the lower half of the crankcase can be dropped without removing any other part. The base for the cranking motor, for the electric generator and for the magneto are integral parts of the engine casting.

Ignition is by Splitdorf magneto mounted on the left side of the engine and driven from the layshaft which drives the fan. In the roadster and bearcat models a double system is employed and on the touring cars ignition is dual.

The six-cylinder motor is of the same general construction as the four-cylinder,



TWO FEATURES OF NEW STUTZ FOUR Showing, B, new style of breather and, C, individual pushrod inclosure

except that it has a smaller bore and a shorter stroke. The bore and stroke ratio—4 to 5—is not extreme, but has been adopted after extensive tests at the factory as giving maximum power combined with elimination of vibration. The crankshaft is supported on four bearings and the valves are inclosed by means of side plates covering each set of three cylinders, instead of by the individual casings employed on the four-cylinder motor just described.

The New Cone Clutch

As mentioned above, the clutch has been changed from the multiple disk of 1913 to a cone type, and a very simple accessible adjustment which is indicated in the rear view of the power plant at A. There have been no changes in the rest of the chassis with the exception of increase in size of brake drums from 14 to 16 inches. The special Stutz rear system, in which the gearset is mounted on the rear axle and provides three speeds, is retained. The axle shafts are supported at the differential ends by tapered roller bearings which not only carry the load but also take up the end thrust. The outer ends of the axle shafts are carried by large annular ball

bearings. Instead of keying on the wheels the axle has squared ends for the rear wheels with a round taper fit. Removal of the axleshaft is provided by simply taking off the bearing retainer, so that it is not necessary to take down the differential.

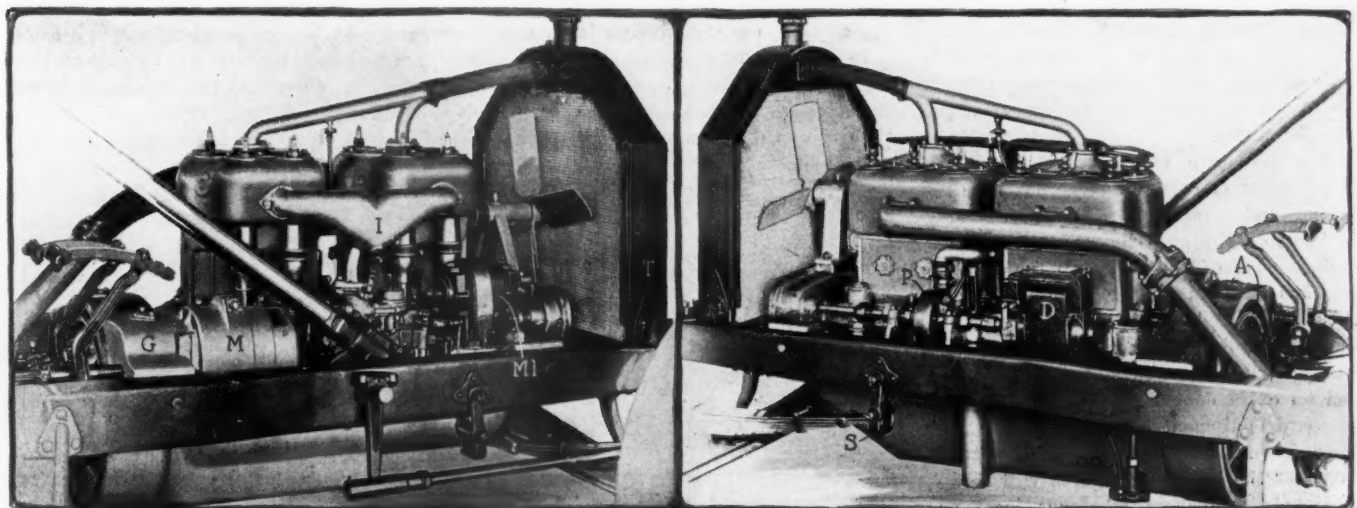
Accessibility Provided

An important item of accessibility is provided in an outside adjustment by which the mesh of the drive pinions and the bevel gear may be altered. By removing two small plates on either side of the differential case an adjusting collar can be reached to move the drive gear in either direction. Annular bearings of liberal size are employed throughout the gearset, and the transmission members. The forward end of the propellershaft runs on roller bearings and the sliding shaft of the gearset has four integral keyways milled from the solid bar.

In order to eliminate the possibility of the gears being thrown out of mesh, due to the action of the rear springs over rough roads, the gearshift mechanism is located parallel with the torsion tube and is designed to insure a positive locking.

The Stutz frame is a pressed steel channel $4\frac{1}{2}$ inches deep and reinforced to a width of 3 inches on the top and bottom, and in the middle of the frame where the frame is well braced with reinforced cross members and there is a pick-up of $2\frac{1}{2}$ inches in the rear, which aids in the straight-line drive. To allow a short turning radius the frame is inswept 3 inches in front of the dash.

Propulsion is through a torsion tube and radius rods, the former going to a center cross member from which it is swung by a yoke, as are also the brake rod brackets. Front and rear springs are both semi-elliptic, the rear ones being specially long and carried by drop forged steel loops. Shackles are double to insure strength. The spring shackle bolts are bored and counterbored to provide for lubrication and have grease cups which are an integral part of the bolt. Practically all of the outside moving parts are provided with



STUTZ FOUR MOTOR AND CRANKING FEATURES
I, waterjacketed aluminum intake; M, cranking motor and engine arm G; and mounting of magneto, M1

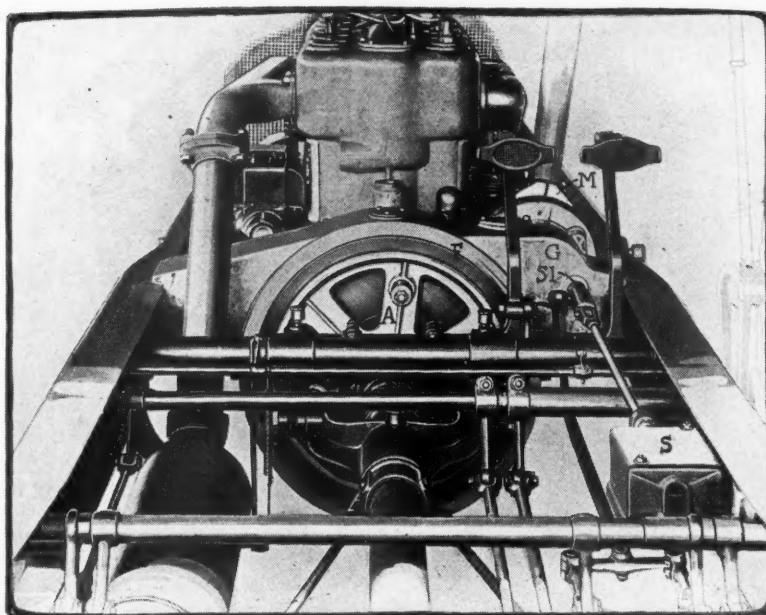
FEATURES OF STUTZ SIX MOTOR AND CLUTCH
A, single clutch adjustment; D, lighting generator on shaft of pump P; S, double spring shackle

grease cups which are quite accessible so that they will not be neglected. That in the rear spring forward shackle is reached through a hole in the apron.

Right Drive

Right drive and right control are retained, although a new feature of the Stutz control is the use of adjustments on the clutch brake $2\frac{1}{2}$ inches. The dash is covered with metal clear to the radiator arch and the indicating instruments and control switches are located on a cowl under the dash, where they are protected from the weather. On the steering column is provided an air adjustment by which the mixture in the carburetor may be altered.

Body designs have been altered somewhat, the touring car bodies being 8 inches longer than the 1913 bodies. Two inches of this addition is in the forward compartment, while there is 6 inches more leg room in the tonneau. The straight-line effect is produced by the six-passenger arrangement, two of the passengers being carried in the extra seats. However, the body this year is 2 inches wider all the way back from the dash. Another change in the seating arrangement is the use of a single cushion in the driver's compartment



ARRANGEMENT OF CRANKING SYSTEM

M, motor on engine arm G enclosing starting gears to flywheel F; S, starting switch; S1, spring returning on starting gearshaft

instead of the two cushions with an arm between employed formerly. The object of this is to give more room for the two forward occupants and also to make it easier for the driver to slip into his seat.

More Graceful Lines Obtained

The sweep of the fenders has been altered so that a more graceful line is produced and the 1914 practice of plain pressed steel fender is followed. The roadster body is equipped with a large gasoline tank on the rear deck and also a trunk for luggage and double tire irons for

spares. The gas tank at the rear is supported on cast steel brackets to which are riveted steel straps which pass under the tank. This does away with the chance of loosening the tank or opening seams due to vibration.

Some Body Details

The racy type of roadster, the bearcat, is similar in every respect to the roadster, but has slightly higher gear ratio. The coupe is fitted to the roadster chassis and has such features of luxury as tufted cushions of Turkish design 12 inches thick and with black walnut and broadcloth trimming above the belt line. A luggage space is provided inside the body back of the seat. The seating capacity is for three persons. An electric dome light is provided as well as the regular outside lamp equipment offered on the other models. The feature of the latter is the combination of electric and oil side and tail lamps.

An option of wire wheels at a slightly increased cost is offered on all of the models. The regular wood wheels have the somewhat distinctive feature that every spoke in the rear wheels is bolted to the brake drums. Tires are 34 by $4\frac{1}{2}$ inches on both front and rear wheels on all the 1914 Stutz cars.

Price Reduction in New Fall Series of Reo the Fifth

A NEW fall series of Reo the Fifth appears with almost the same features throughout as have distinguished the car for the past two years. The only notable change embodied in the recent announcement of R. M. Owens & Co., general distributor for the Reo Motor Car Co., is the reduction of \$220 in the price of the car. The new price of \$1,175 for the touring car or roadster is made possible only by 3 years' concentration on a single chassis model.

Every feature which has made R. E. Olds' latest model distinctive has been retained and numerous timely refinements in body details and equipment have been added. One of the talking points of the Reo has been its complete equipment, and this is amplified in the new fall series, so that the equipment now includes electric cranking, lighting and signalling systems, and an extra demountable rim beside the standard equipment.

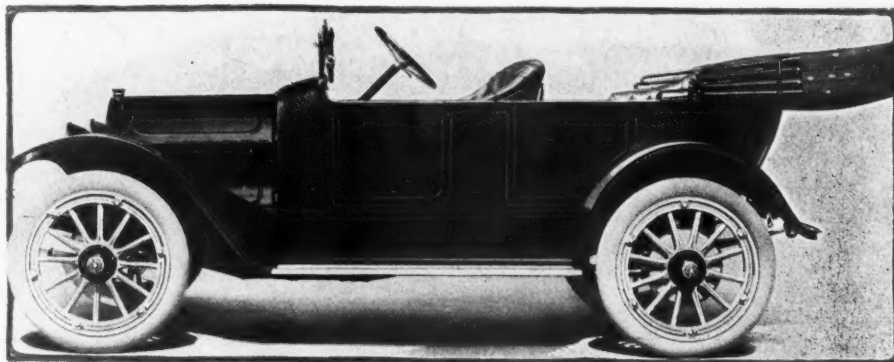
An innovation is the dimming attachment for the headlights, which will be appreciated by drivers wherever local ordinances prohibit the use of brilliant lights. The bodies are of new design—

low-hung, with gondola back. The windshield, of new design, is of the ventilating, clear-vision and rain-vision type. The instrument board with all switches and indicators set flush is within easy reach of the driver. A new style tire carrier on the back holds the tail light and number tag so as to comply with all laws.

In the mechanical features of the car there are no changes of note in the original design produced in 1912, at which time it was distinguished by being among

the first to adopt left-hand drive and center control. Its general specifications as continued for the coming season include a four-cylinder motor with cylinders 4 by $4\frac{1}{2}$ inches in size, with the inlet valves in the head of the cylinder and the exhaust valves in a pocket on the side. The motor is cooled by water circulated by a centrifugal pump and a radiator through which a one-piece fan draws a current of air.

Double heating of the intake air is sup-



REO THE FIFTH FIVE-PASSENGER TOURING CAR

plied by a hood on the exhaust pipe, and a hot-water jacket on the carbureter. The motor is very accessible throughout, the adjustments for the connecting rods being reached through hand-holes in the crank-case, and main bearing adjustments can be made on the outside without opening or dismantling the motor. From the motor, power is transmitted through a multiple-disk clutch running in oil to the three-speed gearset. This is operated by the Reo one-rod control. This is a lever located in the center of the forward compartment, and is so designed that the top

of the handle moves only 3 inches in going from low to high speed. The new series has the lever moved back slightly to further clear the forward compartment. Both brakes are operated by foot pedals, so that the driver's entrance is clear from both sides of the car. Both pedals are fitted with ratchets which permit them to be locked independently or both at once. The brakes are operated by cables instead of the more conventional rods, to eliminate the chance of rattle.

An exposed drive shaft with two universals conducts the power to the semi-

floating rear axle. The wheelbase is 112 inches, tires are 34 by 4 inches in size on demountable rims. Upon this single chassis there are fitted two bodies, a two-passenger roadster and a five-passenger touring car.

In accounting for the price reduction, R. E. Olds, the designer, stated that this was made possible by the fact that all the special machinery, jigs, templates and other tools for this chassis have been charged against the previous output, so that these items of cost now are wiped out in the 1914 production.

Repainting the Motor Car Requires Careful Work

Hints on How the Job Is Done

PAINTING being such a broad term, most owners of motor cars believe that the operation of painting means simply the spreading of paint over the body and chassis. Although this is true to some extent, were paint-spreading attempted the result would be ridiculous.

The first thing, naturally, is to decide upon a suitable color, and though this is usually a matter of personal opinion, a few remarks regarding color would be timely. A visit to any motor car paint shop will reveal the fact that car owners are receding from the stock black and blue and are invading the field of brighter colors. Perhaps the women folk have been the cause of this sudden tendency toward the more vivid hues, for they are better able than men to judge color harmony. It remains then for the owner who wishes to paint his car in accordance with the ideas of fashion to select a shade other than dark blue or black. Economy is another point to be considered. The more dense colors, such as black, blue and green, do not require as many coats as the lighter pigments, and hence the saving in the cost of the paint.

A Bath is First Step

The first step is to wash the car thoroughly, removing all grease and dirt from every part of the vehicle that is to be painted. For this, soft soap, which may be bought at any supply store, is used. A little of the soft soap is placed on a big sponge and the lather rubbed over the car. Do not be sparing with the soap, but give the car a good cleaning. Much depends upon the condition of the car before the paint is applied.

Painting may be done over the old coat, if desired, but the result is not as pleasing as if the old paint were removed. If the old paint is to remain on the car, the operation of painting is just the same as if it were removed. A good job requires that the old paint be removed completely from all parts.

There are two methods of removing the paint from a car. One is to burn it off with a torch and the other is by using paint remover. The former is a difficult

operation for one not accustomed to the work, while the latter requires little skill. The paint remover mentioned may be obtained at any paint shop. This remover is rubbed into the body and other car parts with a cloth. The paint loosened may be then wiped with another cloth. Be free with the use of the remover, so as to be sure that the body is made perfectly clean all over.

In the case of wooden bodies this will require more time than if the body is of metal. The latter type usually does not contain many holes, but it is best always to fill up all crevices in the body before any attempt is made to paint.

Filling Up Cracks

With the car cleaned and afterwards wiped with cloth, the next step is to fill up all cracks and holes. For this, the paint shop men use a special putty which they themselves make. Each man makes his own, hence the composition varies greatly. White lead, however, has been found suitable for filling the cracks and holes. For the holes use thick white lead and for the cracks the mixture should be thinned with turpentine. The white lead should fill the holes and cracks evenly. The lead should be allowed to dry thoroughly. When in this condition the body should be rubbed with a fine grade of sandpaper to even up the surface. Only the places where white lead was used should be sandpapered.

The car is ready now for the first coat of paint. This should be applied with a soft brush and care taken not to get the body streaky. The first coat should be permitted to dry thoroughly, the time required usually being 12 hours. While drying, the temperature of the room should be kept as nearly constant as possible. Drying is best accomplished in a room where the temperature is about 70 degrees Fahrenheit. All windows should be closed to prevent dust settling on the fresh paint. After the first coat has been applied, and has dried, the car is ready for the next coating. The number of applications depends entirely upon the results obtained from the first working. Sometimes, when light colors are used as many as ten coats

are necessary to get an even tone and at the same time cover up all the whitelead spots. The more dense the color the fewer the number of applications necessary. One can tell whether or not enough coats have been applied, for if it appears well to the eye no more need be applied. Wooden bodies require more applications than those made of metal.

Varnishing the Car

After the last coat of paint is thoroughly dry the car is ready for the varnish. When purchasing ask for body varnish. With the body varnish should be mixed a small quantity of the paint, but only enough to give the mixture a slight color. The combination is called color varnish and is used primarily to retain the richness of the paint previously applied. The varnish alone may be used, but much better results are obtained when the color is mixed with it. Do not use the soft paint brush for applying the varnish. A stiff brush is used for this operation. The paint shop man will help one in the selection of the brush.

After the varnish has been allowed to dry the next operation is facing the car. A very fine grade of powdered pumice should be used. First take a big sponge, soak it with water and rub over the surface of the car. Then take a clean cloth and wet it. Dip it then into the powdered pumice, which should be contained in a box. Rub the pumice over the varnished surfaces lightly, for about 1 minute. The reason the pumice is applied is to remove all high spots from the surface and make the latter smooth. The pumice after having been rubbed in lightly should be wiped with the sponge soaked in water. Dry the parts well with a clean cloth.

But a small section should be worked upon at one time; not the whole body pumiced at once. After the entire car has been rubbed with pumice, another coat of color varnish should be applied, and all the parts rubbed again with pumice. After this operation the car is ready for the striping, which, when complete, makes the car ready for the last coat of color varnish.



The Readers' Clearing House



SMALLER MOTORS AND POWER PUMP AMONG OWNERS' DEMANDS

MOLINE, ILL.—Editor Motor Age—Several things in the September 4 issue of Motor Age have struck me rather forcibly. Is it out of place to call the attention of others to these points?

1. Motor Age states editorially, and the results of the Elgin races amply prove its contention, that "the possibility of speed increase with motor decrease" is no longer doubtful. And it adds: "The old days of increasing bore and stroke are no more, except with the crudest makers." If the factory engineers and managers could only be made to realize this! But almost every year we find a score of makers who increase the bore at least of their engines by $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{2}$ inch. They insist the public demands more power, and this is their way of providing it! A simple way no doubt; but is it the scientific way? Is it the way on which future business is going to be built?

2. The latter is a very pertinent question, for the above issue of Motor Age tells of at least five builders who are in receivers' hands, or have been forced to reorganize. And in almost every issue the same tale is repeated on a larger or smaller scale. Some of these factories have been in the business for years and were generally supposed to be absolutely sound, especially judging from their advertisements. The crash comes suddenly, of course, but the causes of it always have been in the making for some time.

3. With ordinary care and foresight, the mechanical part of a motor car is no longer a cause of worry or large expense. The tires, however, are. Hence the article in Motor Age on tire inflation is worth while. I know from tabulated experiments of my own that it pays to inflate your tires well—and that it is a back breaking and nerve racking and perspiration provoking thing to do so with a hand pump! The public and the makers have gone mad for expensive starting and lighting outfits. Why not a more general introduction of a power pump, which is at best a simple and inexpensive feature compared to the electric outfit? Even the lowest priced cars could be provided with one, to their lasting benefit, without materially increasing the price. Will you not push this matter a little more to the front, and thus hasten the introduction of this most desirable, nay most necessary feature?

4. I have long since looked for an engineer who could use enough common sense to remove the electric starter and lighter from under the hood, where it most generally is a cumbersome device, always in the way, and preventing ready access to the motor itself. One designer has at last found the means to do so, providing at the same time an even balance on both sides of the car, ready access to the motor, and to the electric outfit also. May his tribe increase!—D.

LOSS OF POWER IN ANCIENT BUICK Method of Resetting Timer—Cost of Piston and Rings

BLOOMINGTON, ILL.—Editor Motor Age—I recently purchased a used 1910-11 model 10 Buick runabout. In overhauling it I find everything all right excepting that power is lacking for some reason. It is equipped with a new model L Schebler carburetor, which I have adjusted so that it accelerates without explosions in the muffler. I tested the engine for compression and the following table will show the results: No. 1 cylinder, from 35 to 40 pounds; No. 2 cylinder, from 40 to 45 pounds; No. 3 cylinder, from 30 to 21 pounds; No. 4 cylinder, from 30 to 35 pounds. Is this too low a compression for a cylinder having a bore of 3.75? Would the addition of new piston rings to each piston remedy the poor compression, or would it have to be fitted out completely with new rings?

2—What would be the approximate cost of them?

3—Give instructions for setting the timer.

4—What is the original speed of this machine?—Subscriber.

1—In the first place there is too much variation in the compression pressures of the different cylinders. All four cylinders should have practically the same pressure, while your results show a variation of 15 pounds. The Buick 10 should show about 60 pounds compression pressure.

You state that the motor has been overhauled, so it is understood that the cylinders and pistons are free from carbon. The causes of the loss of power in your case seem to be due to improperly seating valves, poorly fitted rings or loose pistons, or excessive leakage around the cylinder plugs. The regrounding of the valves is advisable and should be done after every overhauling job. Usually the replacement of the old rings with new ones helps matters considerably, but no one can tell, except by measuring the pistons and cylinders whether or not these parts are worn so badly as to need replacement.

The use of a heavier grade of oil will prevent leakage past the pistons, and if this is done it will give you a clue as to what is really causing the trouble.

Another thing to watch before attempt-

ing to replace parts is to see that the motor is not directly to be blamed for the poor pulling. A brake drag will often cause the motor to perform poorly, so it would be well to see that the brakes are not adjusted too closely. Sometimes a mo-

tor with tight bearings will show little inclination to pull, but later, as the bearings are worked in, the motor will act better. Motor Age advises that you have the brakes adjusted freely, all the valves ground and the tappets adjusted properly, and this, together with the use of a slightly heavier grade of oil, will no doubt give the motor more power. Motor Age would like to hear with what success you meet in this work.

2—The Buick company in Chicago charges 45 cents for each piston ring and \$2.40 for each new piston.

3—Following are the instructions for resetting the timer on the Buick 10. Turn over the motor until piston No. 1 is on dead center and then look at the flywheel and upon the surface of the flywheel mark off 1 inch from the dead center mark. Turn the motor again until the last mark made occupies the dead-center position. In other words, push the flywheel 1 inch past dead center. At this point place the timer in position with the arm in contact with No. 1 segment.

4—This car, in roadster form, when new was capable of making about 55 miles an hour.

Questions Answered and Communications Received

D. Moline, Ill.
Subscriber Bloomington, Ill.
J. L. Weaver Upper Sandusky, O.
M. S. Detroit, Mich.
W. A. Mathews Hart, Calif.
W. J. Crawford Faribault, Minn.
G. A. Kellis Sonora, Tex.
A. D. Carpenter Sauk Center, Minn.
Subscriber Delavan, Ill.

No letter not signed by the reader's full name and address will be answered.

ing to replace parts is to see that the motor is not directly to be blamed for the poor pulling. A brake drag will often cause the motor to perform poorly, so it would be well to see that the brakes are not adjusted too closely. Sometimes a mo-

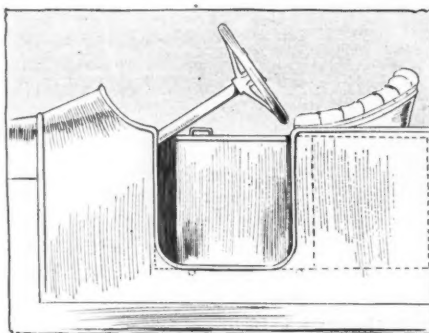


FIG. 1—ILLUSTRATING SLIDING DOOR

DATA CONCERNING MOTOR BALANCE

Rotating Weight Only Taken Into Account—Parts Considered

Upper Sandusky, O.—Editor Motor Age—Are the piston, connecting rod and bearings taken into consideration to balance evenly with the opposite side of the crankshaft?—J. L. Weaver.

No. Only the rotating weight is taken into account, this being the weight of the crank arms and pin, and the rotating

weight of the connecting rod. This is roughly obtained by hanging the rod from a string at the piston pin end and weighing the big end on a scale.

This method is used for ordinary types. In the V motor with cylinders at 90 degrees the piston is taken into account, this being the type being used in most foreign cyclecars. For motor car types the piston weight is not considered.

OBJECTION TO SLIDING FORE DOORS

Reader's Idea Would Not Work Out Well in Practice

Detroit, Mich.—Editor Motor Age—I have an idea which I think would be of value to some motor car manufacturer or body builder. Instead of having foredoors which are hinged, thus making them liable to be broken off when left open in order to ventilate the front compartment, why not use sliding doors like elevators use. I see many drivers leaving the front door open in the summer in order to get a draught, but a door in this position is liable to be broken off by a passing car, or by the negligence of the driver, who may go too near a post. With the sliding doors, such as illustrated in Fig. 1, all objections to the fore-door would cease and this coupled with ease of operation would make this type ideal.—M. S.

The idea is well-sounding, but there are a number of disadvantages of using sliding front doors and these would overshadow the merits. In the first place, body builders are constructing their models with flush sides and the sliding door would break up this scheme because the sliding door must be indented and at the same time lower than the rest of the body. Further, the cost of this type would be considerably more than the hinged door. A sliding door would begin to rattle very soon. You say that riding is uncomfortable because there is no draught in the front compartment. The use of a ventilator remedies this, and as a great number of cars today employ ventilators and as this accessory is cheaper than the sliding doors and accomplishes the same results, it should be preferred.

STICKING VALVE CAUSES KNOCK

Bent or Dirty Stem or Binding in Rocker Mechanism the Cause

Hart, Calif.—Editor Motor Age—I have a 1910 model 17 Buick 40. About 2 weeks ago I noticed a knock in No. 4 cylinder. Can hear it very plainly by putting a screw driver on the cylinder head. Can also hear it down on the crankcase near the exhaust tappet on No. 4 cylinder. The only way I can stop the knock is to lengthen the exhaust pushrod on No. 4 until the valve rides. I have just finished putting in a new camshaft bearing and everything seems to be all right there. The connecting rod and wristpins are apparently all right also. What would Motor Age suggest as the cause, and the remedy?—W. A. Mathews.

The trouble seems to be with a sticking valve. Such a valve will remain open as shown in Fig. 2 with the tappet in closed position. Due to vibration usually the valve springs back into place with the result that a knock is heard. In curing this knock the valve, rocker arm and rod should be removed. Note if the valve is bent, as this is a common cause of sticking. If not try fitting the valve in the guide separately. Then take a piece of fine emery cloth and clean the valve stem well and then dip the valve into kerosene. Try it again in the guide and keep trying

and cleaning with emery until it slips back and forth freely. Then examine all rocker joints to see that they move very freely. A good cleaning usually clears up the mystery here.

STRENGTH OF AN ELECTROMAGNET

For Recharging Magnets Ampere-Turns Are to Be Considered

Faribault, Minn.—Editor Motor Age—I desire to secure a couple of electro magnets to remagnetize magneto magnets. I have a little 15-volt dynamo. Is that large enough? If so, what size wire and number of turns should I use?

2—Does the amount of current play any part in this operation?

3—What voltage would you suggest, also size of wire and number of turns?—W. J. Crawford.

1—You do not state whether the dynamo is alternating or direct current nor do you give the current output.

2—The magnetising ability of an electro-magnet depends upon the number of ampere-turns, which means the number of turns of wire multiplied by the number of amperes flowing through. If there are 2,000 turns of wire consuming 3 amperes,

CYCLECAR SECTION ENLARGED

Beginning with this issue answers to cyclecar inquiries will be found in a separate department under "Cyclecar Developments." The great interest aroused among readers in cyclecars by the cyclecar section of the Readers' Clearing House has made it necessary to devote a separate department to the little vehicles. In the new department it is expected to keep the readers informed as to the developments in the field in America and to draw lessons from European practise. It also is intended to give hints for construction and design by amateur builders.

there would be 6,000 ampere turns.

3—An electro-magnet for recharging magneto magnets was described and illustrated in Motor Age issue of February 20, page 35.

TO CONVERT WHITE STEAM CAR

Will Install Gas Engine, Chain Drive and Radiator—Cost Great

Sonora, Tex.—Editor Motor Age—I have a model O White steamer. Would Motor Age consider it advisable to install a gas engine by using double-chain drive with jackshaft, discarding the gears now in the car, and also use a radiator instead of a condenser?

2—Will 35 horsepower be large enough?—G. A. Kellis.

1—No. The returns would not be great

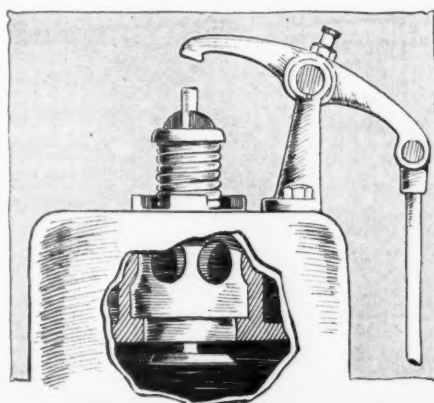


FIG. 2—THE CAUSE OF A KNOCK

enough to compensate for the material and labor necessary to convert the car. It would be cheaper to buy a brand new small car and sell the steamer.

2—A 35-horsepower motor would propel the steamer properly, but as mentioned above such an installation would not be profitable.

LOW FUEL SUPPLY CAUSES MISS

Correspondent Suggests Remedy for A. A. Leissner's Ford

Sauk Centre, Minn.—Editor Motor Age—I feel certain that the trouble with A. A. Leissner's Ford, as per Motor Age, asking advice in reference to its missing, is caused by low fuel supply. This is proven, I feel certain, by his saying it would not throttle down to less than 10 miles per hour, and would run best at higher rates of speed. If giving the motor more gasoline does not end the trouble try a flat file on both electrodes in each spark plug. Not throttling down shows the suction on the high would get more fuel, and less on lower speeds, hence there would not be enough to supply all four cylinders at lower suction or speed. I have had this happen in a big touring car and found the remedy in turning on more gasoline, when the motor would quit its "hopping" or "bucking" and spin like a top.

The weather makes all kinds of difference in the use of a car, and the Ford adjuster on the carbureter—to adjust from the seat—is for this very purpose, and must be used with care. My experience has been less gasoline on a hot day, and more on a cold one.—A. D. Carpenter.

GREASE NOT ADVISED FOR GEARSET

Heavy Oil Considered Better for Buick Planetary Drive

Delavan, Ill.—Editor Motor Age—I have a 1908 model 10 Buick and would like to know what is the trouble with the transmission. I find the pan and the floor of the car covered with grease? Where does it escape?

2—How is the transmission filled with grease?

3—Would a heavy fiber grease help it?—Subscriber.

1—The usual place for oil leakage on the Buick 10 is around the gearset bearings and the rear motor bearing.

2—There is a plug on the side of the gearset case and if the motor is turned over slowly and the case watched the plug will be seen. The plug should be removed and the case filled until it overflows, with 600 W, which is a grade of steam engine oil. The Buick company recommends this oil and does not advise using grease.

3—No.

Suggests Replacing Steel Ball

Croton Falls, N. Y.—Editor Motor Age—If A Reader from South Haven, Mich., will replace the steel ball in the side of the distributor, perhaps he will remedy his trouble. I have a 1910 6-60 Premier and had similar trouble. I found that the ball was worn flat, and thereby failed to make contact with the distributor cam.—Augustus A. Juengst.

France Puts Its O. K. on Thirty-Eight Motor Trucks

Results of the Recent Army Trials Announced—Tests this Year More Strenuous than Ever— Seventy-Two Start and Sixty-Eight Finish 2,200-Mile Run

PARIS, Aug. 29—Six weeks ago, seventy-two trucks started in the French army trials, sixty-eight of them returned to headquarters after covering 2,200 miles on varied roads, and after a close technical examination thirty-eight models have been recognized perfect.

These thirty-eight machines represent nineteen distinct models, each firm having the right to enter two units per class, which can be sold to the general user as army subsidy types. Purchasers of these types can claim the army subsidy by keeping their trucks in good running condition and guaranteeing to turn them over to the army in time of mobilization.

The successful firms in the trials are Delehay, four models; Latil, two; Berliet, four; Saurer, two, and Panhard-Levassor, de Dion-Bouton, Delaunay-Clayette, Brasier, La Buire, Peugeot, Aries, one model each.

Fail to Qualify

The firms having failed to qualify in the trials are Renault, Balachowsky & Caire, Rochet-Schneider, Motobloc, Clement-Bayard, Lorraine-Dietrich and Cohendet. In addition to these failures, the following firms figuring on the honors list were not successful in getting all their vehicles passed for acceptance: Latil, one model eliminated; de Dion-Bouton, two models eliminated; Delaunay-Clayette, one model eliminated; Saurer, one model eliminated; Peugeot, three models eliminated; Aries, two models eliminated.

As the result of these trials the army authorities decided that the following makes of rubber tires could be fitted to army trucks: Gaulois, formerly known as Bergougnan, which were fitted to a majority of the trucks; Continental, Hutchinson, Goodrich, Lutetia, Dunlop, Grammont.

With more than 47 per cent failure, it is evident either that the trucks were of poor quality or the competition was exceptionally severe. It was the latter condition which prevailed. With the growing popularity of the subsidy system and the improvements that have been made in design and construction, it has become possible for the army authorities to raise their standard. They have not failed to do this. The distance on the road was increased; average speed was put up from 7.4 to 9.3 miles an hour with the object of eliminating steel-shod trucks. In this it was successful, for none but rubber-shod vehicles succeeded in getting the subsidy.

The hill-climbing test and the towing test on hills was rendered more severe, and finally the technical examination was much more searching. This final examination was one of the most important features of the competition. After coming

back to Versailles after a month on the road, all bodies were stripped off and the technical committee had power to order any part of the machinery to be dismounted. They did not fail to take advantage of the facilities offered them. Not a vehicle was allowed to pass without some essential organ being taken down.

In some cases the trucks were pulled down entirely. As an instance, one truck had its motor and gearbox taken out. Cylinders were dismounted, lower portion of crankchamber taken off, timing gears exposed, clutch entirely disassembled, gearshafts taken out; steering gear was tested, propeller shaft was taken down, universal joints examined, and differential housing opened to examine gear and bevel pinions. If more than normal traces of wear could be found, the vehicle was disqualified.

Some of the most valuable information regarding these trials is kept by the war department for its own benefit. Fuel and oil consumption, for instance, is carefully noted, but these figures are not communicated to the makers; each man knows what his own vehicle is doing, but has little information regarding the others. In the technical examination the reasons for disqualification are not made known to the interested party. It is only possible to judge why the officers have disqualified a vehicle by being present at the examination and noting the condition of the parts. It is recognized that this work is done thoroughly, and although there is not a great deal of publicity around the trials themselves, the results are recognized as the high water mark of efficiency and are largely influential in effecting sales.

Standardization Requirements

A certain amount of standardization is imposed by these trials. It is complete with regard to bodies; no latitude is allowed either with regard to clearance. All magnetos must be interchangeable, a standard pitch for side chains is being insisted on; tire sizes have been standardized, attempts are being made to make all wheels interchangeable, and to obtain a standard size of brake shoe and brake drum. Four-cylinder motors and four-speed gearboxes are obligatory, but in all other features manufacturers are given a free hand.

The road incidents, so far as they can be ascertained, were of a varied nature. One motor went out with a cracked cylinder, evidently due to a faulty design; on two different makes a connecting rod bearing burned out; in each case the lubrication was by constant level splash. There was a third case of a burned-out connecting rod bearing; this was repaired on the road, but owing to the obstruction of an

oil lead the new bearing also ran out. A connecting rod broke on one of the competing trucks; the disabled vehicle was taken in tow by its companion, but the extra load caused the breakdown of the relief truck. Owing to leaks, three different radiators had to be fitted on one of the trucks; it covered the distance, but was not accepted. In a number of cases brakes proved to be weak or faulty.

Many Slow-Speed Motors Used

With a few exceptions, motors were of the slow-speed type, the number of revolutions not exceeding 1,000 or 1,100. Brasier, de Dion-Bouton, Clement-Bayard and Motobloc were the only ones using motors at a higher speed. In the matter of piston speeds, the highest was 24 feet 8 inches per second on the Motobloc, the lowest 13 feet 1 inch per second on the 2-ton Saurer, and the average 16 feet 6 inches to 17 feet. In the case of the Saurer, the same motor was used for the 3-ton as for the 2-ton truck, the former running at 1,100 revolutions and the latter governed down to 850. With a minimum useful load of 2 tons and a maximum of 3½ tons, the extreme motor dimensions were 2.9 by 4.7 and 5.1 by 6.2 inches bore and stroke. The average bore and stroke was 3.9 by 5.5 inches bore and stroke. The average indicated horsepower was 22 to 25; the minimum was 14 and the maximum 45 for the Peugeot tractor.

In the hill-climbing test the truck with a 3-ton load was entirely successful, while the slow-speed motor with only 2-ton load was unable to make the ascent. In practically all cases the lubrication was by forced feed to all bearings or a combination of forced feed and constant level splash for the connecting rod ends. High-tension ignition was used throughout. Thermo-syphon and pump water circulation were about equally represented. The Solex coil tube radiator with a fan in the center predominated in the competition. This is the type of radiator used on all the Paris buses.

Carbureters were a varied set; in view of the necessity of using three different fuels, an additional air supply controlled from the dash and supplementary hot-air fittings were found on several machines. Fuel consumption was carefully controlled. Account also was kept of the amount of oil used, but the regulations were not sufficiently severe under this heading, and it was not a difficult matter for an attendant touring car to pass up a can of oil to any one of the trucks while the army observer was temporarily absent. This fraud was not possible with the fuel.

Certain defects were noted in gear ratios and in the matter of clutches. Even where

side chains were not employed, direct drive was not always used, there being several cases of a double reduction in the rear axle. Among the few models with direct drive was the 2-ton Saurer with the slow-speed motor, the pinion having seven teeth. The hill-climbing test, which proved the suitability of the gear ratios, and also the value of the clutches, took place on a hill starting at 5 per cent gradient, increasing to 7, and finishing at 4 per cent.

Each truck had to haul a companion vehicle of equal weight up this slope. In a few cases the first-speed gear ratio proved to be too high, the vehicles stopping on the 7 per cent gradient and having to get away with the aid of the motor of the towed truck. Several of the cone

clutches showed a lack of flexibility. Trucks which had climbed the 6 per cent gradient were unable to get away on the 4 per cent portion owing to the clutch taking hold too roughly and stalling the motor.

Wheels proved very satisfactory, there being no break-down under this heading and the condition being good at the finish of the run. The few metal wheels which took part in the competition also gave good service. They were of two types: cast wheels and disk wheels of steel stampings. The distance covered was not sufficiently great to prove which was the better system.

Very satisfactory wear was got out of tires. Here again the distance covered

was not sufficient to prove the full value of the rubber bandages. There was only one case of abnormal wear, this being a Motobloc which had been in collision and ran a considerable distance with the front wheels out of true. As the General Omnibus Co. in Paris is averaging 21,000 miles on a set of rubber tires, trouble was hardly to be expected on vehicles covering but a tenth of that distance. It must be remembered, however, that in most cases the speed was very much higher than the official average imposed. On several of the long distance stages all the drivers maintained an average of 18 to 19 miles an hour for 3-ton trucks and the heavy tractors showed 13 to 14 miles average for a 100-mile run.

Pierce-Arrow Company Has New 2-Ton Truck

ENTER a new motor truck. This one is offered by the Pierce-Arrow Motor Car Co., and is a 2-ton replica in all of its important points of the 5-ton truck which has gained this firm its reputation on the truck field. It includes the general motor design, the transmission and worm drive, and all those special Pierce features with which the truck enthusiast is familiar.

This car takes an admissible load on the chassis, including body, of 5,200 pounds. The body itself is 10 feet 6 inches long and 5 feet 6 inches wide, the floor being 3 feet 6 inches from the ground. The wheelbase is 12 feet 6 inches, and the tread standard 56 inches. From the ground line to the top of the frame the distance is 30 inches when the truck is light. The width of the frame is 34 inches.

The power plant of the car is a four-cylinder motor of 4-inch bore and 5½-inch stroke, T-head type, the cylinders cast in pairs. The motor is rated at 30 horsepower at 1,000 r. p. m., according to the S. A. E. formula. A governor is fitted to the motor which limits its speed to a maximum of 1,050 r. p. m. or with standard gear ratio a road speed of about 16 miles per hour. This governor is stated to the proof to any tampering by the driver, and cannot be crowded. The valves, valve gear, camshafts, crankshaft, etc., are exactly as in the 5-ton truck. All oil tubes but two are inside the motor, there being only four outside oil joints to keep tight.

Ignition is controlled by a single lever on the dash, leading directly to the magneto. The carburetor is of the automatic type, throttle control is effected by foot accelerator.

The clutch is of the leather-faced cone type and standard, its control being by the usual foot pedal. The gearset, following usual practice in design, is made further efficient by the use of self-aligning bearings throughout. The design has minimized the number of grease and oil cups by using a self-oiling type of bearing in inaccessible places.

The wheels are of wood, and the thrusting effort taken through two side radius

rods and not through the springs. Tires are 36 by 4 single front, and 36 by 4 dual rear. The road speeds are as follows: Direct, 16 miles; second, 8 miles; low, 4 miles; reverse, 3½ miles. The truck has been on the road for thorough testing and in service use for some time, and is a thoroughly developed machine.

FREE RIDES FOR CUSTOMERS

Boggs & Buhl, one of Pittsburgh's largest retail store owners, have put into operation two motor buses to carry passengers to their store on the north side. Patrons

of the establishment are taken free from any part of the downtown to the north side store. A regular schedule is being maintained through

the downtown streets now, but this latter will be extended to take in all the railroad stations. Each car is capable of seating twenty persons. They will be well heated.

ANOTHER DEFEAT FOR THE HORSE

According to L. S. Ingalls, of the Ingalls Lumber Co., New Haven, Conn., that firm has a 4-ton motor truck that is performing service equivalent to that of seventeen horses. The Ingalls' truck, which is a Kisselkar, is used in hauling railroad ties to Niantic, Conn., for shipment. The round trip covers a distance of about 20 miles and the record of the motor truck on this run is compared with the work of a four-horse truck which is also employed. According to the figures, the motor truck makes three round trips a day, carrying sixty ties each trip or a total of 1,080 per week. The horse-drawn truck, on the other hand, makes only one trip a day, carrying fifty ties or 250 per week.



Views of chassis and details of new Pierce 2-ton truck. Above is shown the gearset and controls, with the cover plate and levers removed in unit; below is a quartering view of the complete chassis. The main features, it will be noted, differ but little from the 5-ton truck made by the same firm. The 2-ton truck is in fact a smaller replica of the very successful 5-tonner



CAT
DOG
MOTOR
PLUG

The Motorist's Kindergarten

EDITOR'S NOTE—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car.

PREVIOUS articles in this department discussed the different parts of the motor car, their design, construction and relative positions. In this article will be taken up the method of suspending the frame and the relation of this part to the others already discussed. The frame is the foundation of the car, just as steel framework is the backbone of a big building. Everything is built around the frame. It has already been shown how the motor, gearset and springs are attached to the frame and now will be taken up the different methods of suspending the frame with the springs as a unit.

When motor cars first came into use the bodies were fastened directly to the springs and the springs to the axles and there was no such thing as a frame, as we know it today. But as the car developed the frame was used to support the motor and body, etc. Most of the cars of today employ metal frames, but a few use wood. The Franklin is one example of the latter.

The first cars had the springs fastened on top of the front and rear axles and this method of suspension has come to predominate over the rest, which are described in this article.

Meaning of Overslung

The type which is used on the majority of pleasure cars of today is known as overslung construction. This type is illustrated in the upper illustration in Fig. 84. It will be noticed the springs at either end of the frame are fastened at their centers to the front and rear axles. Here the springs and frame are above the axle. However, there is in use today on

Chief Methods of Frame Suspension Explained

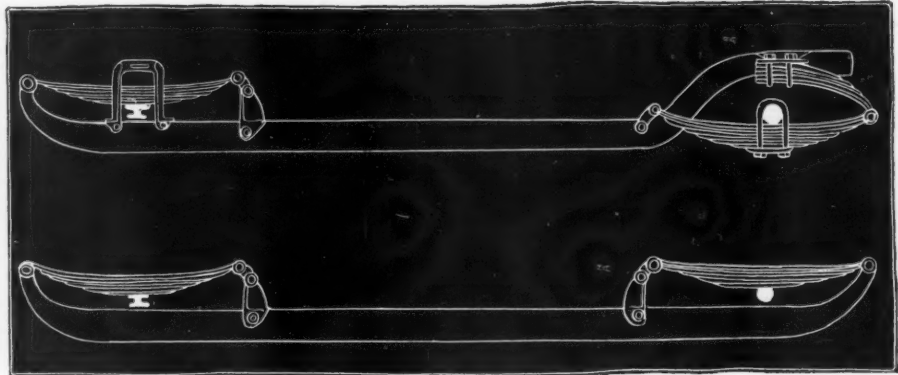


FIG. 85—UNUSUAL FORMS OF SUSPENSION

A new form of suspension brought out by the Mason company this year and called the under-overslung is shown in the upper illustration. Note that here the front springs are above the axle and the rear springs below and the frame underslung in front and overslung in the rear. The lower picture shows the true underslung construction in the both springs are above the axles and the frame below

a few cars, such as the American, Norwalk, Omaha and Regal, what is called underslung frame suspension. Instead of the frame being over the axles it is placed under the axles as shown in Fig. 85. The springs are here shown fastened to the tops of the front and rear axles and the frame suspended underneath. This method of suspension lowers the center of gravity of the car, which is said to keep the car on the ground when taking turns at high speed. In the overslung suspension mentioned above the center of gravity or concentration of the mass of the car is higher than in the underslung construction.

The underslung frame suspension should

not be confused with underslung spring suspension shown in the lower illustration in Fig. 84. Here the frame is above both axles, but both front and rear springs are fastened underneath the axles instead of on top as in the other constructions. This method lowers somewhat the center of gravity of the car without resorting to the underslung frame.

The Under-Over Type

There has come into use another type of suspension called the under-over type. This is illustrated in Fig. 85 in the upper illustration. It will be noticed the front springs are fastened above the axle and the rear springs underneath the axle. The Mason car for 1914 uses this method of suspension.

With the over-slung construction almost any type of springs may be used without causing the car to have a poor appearance. With the underslung, however, it is difficult to use elliptic or three-quarter elliptic springs in order to obtain easy riding. However, the adherents of underslung construction claim that the very fact that the frame is underneath makes the car easy riding and that this is increased by the large wheels which may be used with this type of vehicle. With the overslung the use of big wheels makes the car look awkward and at the same time brings the center of gravity very high. There are many reasons for and against both overslung and underslung and it is a question which is the better type of suspension.

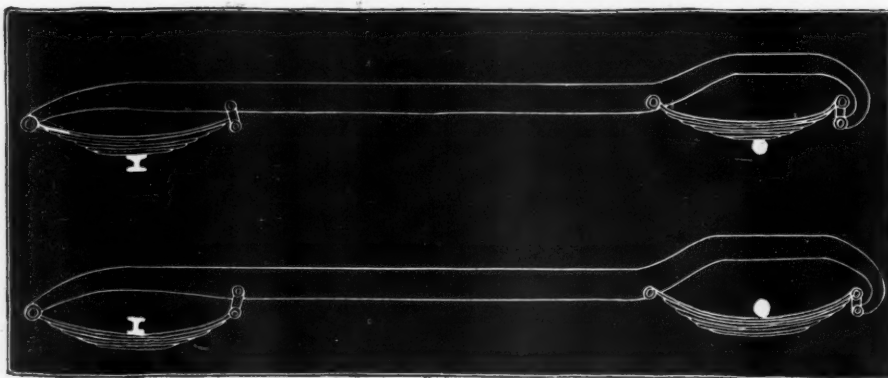


FIG. 84—TWO TYPES OF FRAME SUSPENSION

In the upper illustration is shown the overslung suspension which is used on the majority of the cars today. Note that here both front and rear springs and also the frame are above the axles. In the lower illustration is shown a form of suspension in which the frame is above the axles but the rear springs below

The Motor Car Repair Shop

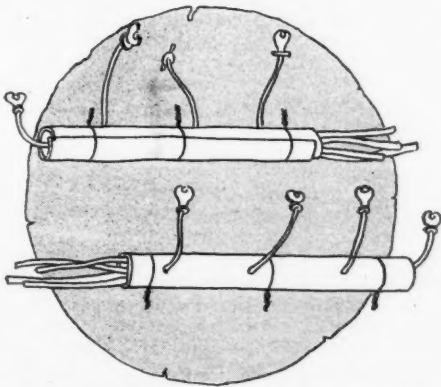


FIG. 1—HOMEMADE IGNITION CONDUIT Housing Ignition Wires

LEAVING ignition wires lying on the cylinders may cause the insulation to burn off in places, with the result that the motor will misfire, due to a short circuit. A housing may be made for these wires at a cost of about 10 cents. At the supply store may be bought a piece of sheet fiber, the length and width depending entirely upon the size of the motor. If it is a small four such as the Hupmobile 20 a piece of fiber about 10 inches long and 5 inches wide is sufficient. This piece is rolled up and then placed lengthwise upon the cylinders. With a pencil the fiber is marked at the points opposite the spark plugs. Holes are then cut out of the fiber at these points. The wires leading to the plugs are then slipped through their respective holes and two pieces of wire placed around the fiber tube as shown in Fig. 1. The tube will protect the wires from heat and dirt. It would be a good idea to tape each wire separately before placing it in the tube and then giving all a coat of shellac. If possible the tube should be wired to some part of the motor to prevent it from being tossed around. However, this is not necessary if the binding wire of the tube is made tight.

Emergency Brake Drags

Many cars of today are equipped with all-metal brake bands and when these begin to drag, or in other words, rub against the brake drum, not only is the sound uncomfortable, but the motor must do a little more work to keep the car going at a given speed. Brake drags should be cured as soon as they become evident.

In the case of the emergency brakes internal expanding, which is true in a number of instances, it remains to remove the wheel and the outside brake bands, if there are any. The inside of the brake drum is then given a thin coat of lamp black, previously dissolved in oil. The wheel is then placed in position, and given about a dozen turns with the hand.

Some Hints for the Amateur

When the wheel is removed, the lamp black will have touched the high spot on the brake bands, in which case black will appear on the band metal. So wherever black appears on the metal, the drum is touching, but with the brake lever off the band should not touch. If there are a number of places which show contact with the drum, file the high spots with a bastard file and finish with a mill file.

If the rubbing is at one place only or perhaps two, one on each side, which is more likely to be the case, take a soft hammer and give the band a good blow at the high spot. If there is no soft hammer about, place a block of wood on the band and strike the wood with an ordinary hammer. The striking with the hammer usually springs the band enough to clear the drum. After striking, replace the wheel and try again and keep striking the bands until they are clear of the brake drum.

Making a Lock Washer

Lock washers or spring washers, as valuable as they may be, are not used as much as they should be, due in many instances to the fact that when work on the car is being done there are no such washers at hand. Rather than place a nut in position without a lock washer of the usual type, it is better to make a device that will prevent the nut backing off. All that is necessary for this is a piece of thin sheet iron, the size depending upon the size of the nut to be held in place.

As shown in Fig. 2, the sheet is slit at both ends and a hole punched in the center. This is for the insertion of the bolt or stud. The flat piece of metal is first slipped over the stud and then the nut threaded on and when the nut is as tight as wanted the sheet is bent as shown, the parts dividing. The same is done with the slit on the other side of the nut. The small pieces of metal on four sides of the nut prevent it from backing off. This practice is one often resorted to on the road.

Making a Nut Hold

Although it is not good policy to destroy one thing for the sake of another, still when a motor car is on the highway, dead, one must go to extremes to get it started. Not long ago a driver had occasion to remove the intake header of the carburetor in order to replace the gaskets which had become leaky. It was found, when it came to replace the header, that one of the studs which held it in place would not take the nut well. The first few threads were in good condition

but the rest would not hold at all. The condition was the result of pounding off the header which had rubbed against the threads and flattened them. In order to keep the header flange in place the driver removed one of the big nuts which held the battery box in position and placed it over the stud first. It cleared the threads. The outside threads of the stud being in good condition, took the nut and the header flange was kept firmly in place. A stop at the next garage gave the driver an opportunity to run a die over the stud and obtain a new nut to fit it.

Grabbing Cone Clutches

Two clutch evils, while diametrically opposite, frequently go together, the twin disorders of maladjustment and bad repair of the facing. When you have dressed the old facing down, or substituted a new one, replace the cone, and turn the adjusting nut back to a position in which the spring will press very lightly on the clutch. Now set your brakes and adjust the clutch until you are able to kill your motor, but not much more than this.

Now take your car out on the road and test the clutch. If you find that with the facing in proper condition the clutch when adjusted just tight enough to hold still grabs, the spring probably has become deformed, so that it must be cramped to hold the clutch properly. The remedy for this is to put in a new spring. If you think that the spring is all right, and can find no cause for the slippage other than inherently bad action, due to poor design, put slots in the face of the cone, and insert flat springs beneath the leather.

These will cause these points partially to take hold before the whole face of the cone contacts, thus softening the action. Care should be observed in fitting springs of this character to insure ample depth of the slots. The springs should be pressed wholly below the surface of the cone, so as not to present any unevenness on the face of the clutch.

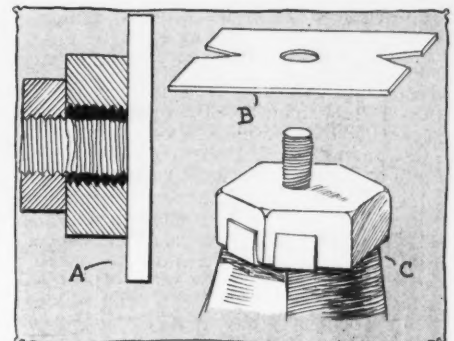
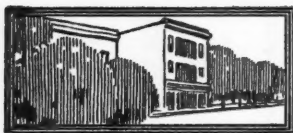


FIG. 2—A SIMPLE NUT LOCK



Among the Makers and Dealers



TWIN City Motor Show Success—Twenty-five motor car and motorcycle dealers made a great showing at the annual fall exhibition at the state fair grounds in the twin cities, September 1-6. Several factories sent up representatives to demonstrate and the exhibitors sent out special salesmen.

To Make Cyclecar Motors—The Sterling Motor Works, Detroit, has taken over a portion of the factory formerly occupied by the Chevrolet Motor Co. and will manufacture motors for cycle cars. William C. Little is at the head of the Sterling Motor Works.

Toronto Factory for Goodrich—The B. F. Goodrich Co., of Akron, O., has decided to build a large Canadian branch in Toronto, according to word from the head office of that concern just received there. The branch, the Goodrich company states, will employ 1,800 workmen at the start. The location of the factory has not been made public.

Judge Orders Property Sold—The real property of Clinton D. Firestone, formerly president of the Columbus Buggy Co., now defunct, was ordered sold by Judge Rogers in court recently. The property is appraised at \$107,000, and the proceeds are to be distributed among the creditors. L. M. Browne, formerly connected with the sales department of the Columbus Buggy Co., has been made sales manager of the concern under the creditors' committee which is operating the plant.

Warn Against American Invasion—Stuart R. Shepard, president and general manager of the Rhineland Machine Works and the Hudson Export and Import Co., returned to this country recently after a month's business trip to Europe in the interests of the Rhineland ball bearings and the A. V. shock absorber. Mr. Shepard reports that the American made cars are making great progress in sales and European papers are filled with editorials warning their own manufacturers to be on the alert for the aggressive American manufacturers, who are now getting the larger part of the foreign motor car sales.

Buy Bankrupt Yale Concern—The plant of the Yale Motor Equipment Co. at Oostburg, Wis., is now certain to be continued as a factory for the production of motor car accessories and equipment. At the sale of the estate of the bankrupt Yale concern, F. A. Tuschen of Milwaukee and A. G. Scheuerell of Sun Prairie, Wis., purchased the buildings and equipment for \$17,275. The patent rights are included and it is the intention of the new owners to resume operations at once along the lines of the old concern. The feature of the Yale line was a silencer, or muffler, which will be produced in large quantities. The concern will also manufacture horns, cut-outs and other parts.

Start Work on Oregon Plant—Work has been commenced on the factory of the Beaver State Motor Co. at Gresham, a suburb of Portland, Ore., upon a 5-acre tract located on the Mount Hood line. The Beaver State Motor Co. is organized under the laws of the state of Oregon, having a capitalization of \$300,000, and is financed sufficiently to begin operations. The company will construct a six-cylinder, worm-driven machine, especially adapted to the Pacific coast trade, so as to meet the mountain road requirements peculiar to this section of the country. There will be but three models, and the wheelbase of the car will be 126 inches. It is the intention to manufacture such

parts as will meet the local condition in the matter of prices and assemble such other parts as will create an advantage in the manufacture of the machine.

Shock Absorbers at Elgin—Through an oversight the shock absorber equipment of the cars which started in the 2 days of racing at Elgin was omitted from the equipment table published last week. Truffault-Hartford shock absorbers were fitted to every one of the cars that started, except one, and that car ran only 35 miles.

Reopen Plant at Manitowoc—Due to the large amount of motor car business booked, necessitating the use of its entire available facilities, the Aluminum Castings Co. of Cleveland, O., has reopened its plant at Manitowoc, Wis., which was closed May 1 because of continual labor troubles. It had been reported that the Manitowoc foundry would be abandoned. At present the foundry is working about three-quarters of normal and most of the production is concen-

trated on castings work for the Mitchell-Lewis Motor Co., Racine, Wis. As many as 200 men have been employed at the Manitowoc shop in the past and it is believed this number will be approached shortly.

Bosch Building Rest Casino—Work has been started by the Bosch Magneto Co. on a casino building to cost \$18,000 in Springfield, Mass., opposite its factory. The building which has been contemplated for some time will be a rest and recreation structure for the employees of the company. It will face on North Main street, and the dimensions are 84 by 107 feet.

Redman Suffers Paralytic Stroke—H. Emmett Redman, treasurer of the Mitchell-Lewis Motor Co., Racine, Wis., is in a critical condition as the result of a stroke of paralysis which he suffered on the evening of August 31 while discussing business matters with William T. Lewis, chairman of the board of directors. Mr. Redman was unconscious for more than 24 hours.

May Make Cyclecar East—Inquiries made with regard to the plans of the American Cyclecar Co. recently organized in Detroit lead to the belief that it is the intention to manufacture the car in the east. Substantial financial interests are back of the company which is owned and controlled by the Connecticut Electric Mfg. Co., of Bridgeport, Conn.

Truck Factory for Indianapolis—Another motor truck factory is to be established in Indianapolis soon, the Koogle Auto Co., now in the repair and painting business, having arranged to build and distribute the 1½-ton Auglaize truck now manufactured at New Bremen, O. As a preliminary step, the Koogle company is letting contracts for a 2-story factory building, 175 by 80 feet.

L. M. Bradley with Moline—Adopting a more liberal and progressive selling and advertising policy than at any time during its 9 years' career, President W. H. Van Dervoort, of the Moline Automobile Co., East Moline, Ill., makes the announcement that he has secured L. M. Bradley to direct the advertising campaign and assist Sales Manager C. H. Van Dervoort in building up even a stronger sales organization than in the past.

Air Spring Capital Increased—Notice has been filed with the state officials by the Westinghouse Air Spring Co., of Pittsburgh, Pa., of an increase in capital of from \$200,000 to \$2,500,000. This company was formed by George Westinghouse about a year ago to make a new air spring for motor cars, which the inventor believes will ultimately supplant pneumatic tires. The company is said to be in position now to enter the field commercially within a short time on a large scale.

Dynamiting Plot Is Foiled—Jerry W. DeCou, general superintendent of the Thomas B. Jeffery Co., Kenosha, Wis., was the prospective victim of a dynamiting plot which was frustrated in the nick of time by the Kenosha police. It appears that George Koscak, a Croatian, who was discharged by the Jeffery company 10 days ago, swore vengeance upon Mr. DeCou and planned to blow up his home, it is said. Koscak confided in a fellow workman, who happened to be a private detective for the company, and on the evening of August 30, the time set for the plot, the police raided the discharged employe's home and found everything prepared for the dynamiting. Mr. DeCou had received an intimation of trouble

Coming Motor Events

- September 12—Track meet, Canfield, O.
- September 13—Track meet, Grand Rapids, Mich.
- September 12—Track meet, Sandusky, O.
- September 13—Track meet, Milwaukee, Wis.
- *September 13—Track meet, Toledo, O.
- *September 13—Track meet, Covington, Ky.
- September 14—Track meet, Seattle, Wash.
- September 18—Hill climb, Asheville, N. C.
- September 20-21—Track meet, Detroit, Mich.
- September 21—French light-car road race, Boulogne.
- September 25—Tourist trophy stock-car road race, Isle of Man, Great Britain.
- September 27—Track meet, White Plains, N. Y.
- *September 27-28—Track meet, Bakersfield, Cal.
- October 3—Track meet, Trenton, N. J.
- October 3-4—Track meet, Oklahoma City, Okla.
- October 4-11—Chicago Motor Club's Around Lake Michigan reliability.
- November 2-3—Los Angeles-Phoenix road race.
- November 4-5—Road race, El Paso, Tex., to Phoenix.
- November 6—Track meet, Phoenix, Ariz.
- *November 24—Vanderbilt road race, Savannah, Ga.
- †November 27—Savannah grand prix.

*Sanctioned by A. A. A.

†Sanctioned by A. C. A.

SHOWS, CONVENTIONS, ETC.

- September 20—American road congress, Detroit, Mich.
- October 6-18—St. Louis show.
- October 15-25—Electric show, Grand Central palace, New York city.
- October 17-27—Paris show.
- October 27-28—Convention Electric Vehicle Association of America, Chicago.
- November 7-15—Olympia show.
- December 9-12—Annual convention of American Road Builders' Association, Philadelphia.
- December 11-20—First International Exposition of Safety and Sanitation, New York city. American Museum of Safety.
- January 3-10—New York show, Grand Central palace.
- January 24-31—Chicago show.
- January 26-31—Scranton, Pa.
- January 31-February 7—Minneapolis show.
- February 9-14—Buffalo truck show.
- February 21-28—Newark, N. J.
- February 22-March 5—Cincinnati, O.
- March 7-14—Boston passenger car show.
- March 17-21—Boston truck show.

and sent his wife and children into the country several days before the plot was uncovered.

Body Company Increases Stock—The Capital Body Co., of Indianapolis, has increased its capital stock from \$10,000 to \$30,000, according to notice just filed with the Indiana secretary of state.

White Esterline Sales Manager—W. McKay White, formerly of the Marion Motor Car Co., has been made sales manager of the Esterline Co., of Indianapolis, maker of electrical accessories.

Buys Cranking Device Patent—The M. Rumely Co., of Laporte, Ind., has purchased of George E. Wilson of Stillwater, Minn., the patent on a combined safety cranking device, clutch and pulley for explosive engines, according to an announcement recently made.

Maxwell Sells Courier Factory—In pursuance of its policy of turning unavailable assets into cash capital, the Maxwell Motor Co. has sold the old Courier plant at Dayton, O., for \$50,000.

Studebaker's Asia Agent Here—James B. Crockett of Detroit, who has for the past 2 years been traveling in the far east in the interests of the Studebaker Corp., arrived in New York recently on the Carpania from Europe and will spend a month at the factory. Mr. Crockett has charge of the Studebaker business in Asia.

Electro Receiver is Asked—The Roller-Smith Co. has brought suit in the circuit court at Indianapolis asking that a receiver be appointed for the Electro Light and Starter Co., alleging the concern is in danger of insolvency and owes the plaintiff \$2340. F. H. Wheeler is president of the Electro Light and Starter Co. He has not been active in the company's management, however.

Takes Over Michigan Business—The Edward F. Gerber Co., of Pittsburgh, has arranged to take over the business of the Michigan Motor Car Co., the Michigan Buggy Co. and the Kalamazoo Blanket Co. and will make Pittsburgh the headquarters for the executive and financial offices, as well as the advertising department. The Kalamazoo plant will be operated as a manufacturing proposition.

Columbia Car Service Assured—Arrangements have been completed for the continuance of the repair department of the Columbia Motor Car Co., the main plant of which is discontinued by the Maxwell Motor Co. In order that Columbia car users may be cared for the Columbia Auto Repair Co. has been formed. William P. Welch who has been superintendent in the main shops, Edward Copeland and Thomas Hughes will conduct the affairs of the new organization.

Zenith Official is Decorated—More than usual interest attaches to the announcement that Antonin Boulade has just received the decoration of the national order of the Legion of Honor for distinguished services in military aeronautics, military balloon-photography and carburetion. Mr. Boulade is vice-president of the Detroit Zenith Carburetor Co., which is one of four plants located here, in Germany, England and France.

Sales Boom in California—California's motor car investment for July is figured at \$5,362,000, bringing the total spent for motor cars—for business and pleasure purposes—for the year to date up to \$44,666,000, according to the figures given out by the motor vehicle department at Sacramento. A total of 2681 new machines were registered for July. With the exception of February, when but 2604 new cars were recorded, July registrations are fewer than for any month thus far this year. In June 3143 cars were registered. It is estimated that motor car salesmen made about \$1,340,500 in commissions on the sale of cars in July. The receipts for the motor

Recent Incorporations

Atlantic City, N. J.—Parkway Co., capital stock \$100,000; incorporators, W. Lewis, R. L. Beyer, J. H. Hayes, Jr.

Ayer, Mass.—E. O. Proctor Co., capital stock \$50,000; incorporators, Edward O. Proctor, G. L. Donahue, W. L. Preble.

Brooklyn, N. Y.—Williams Auto Service Co., capital stock \$2,500; incorporators, Lawrence C. Saglona, Annie S. Williams, Albert E. Williams.

Brooklyn, N. Y.—Killmer Co., capital stock \$10,000; incorporators, Nelson B. Killmer, Ralph H. Killmer, Mary A. Killmer.

Brooklyn, N. Y.—Brushwick Automobile Co., capital stock \$2,000; incorporators, David Werchen, Isaac Rosenberg, Sophie Rosenberg.

Buffalo, N. Y.—Biggam Engineering Co., capital stock \$200,000; incorporators, H. F. Biggam, B. C. Fagley, O. Seelbach.

Calder, Ill.—Angler Automobile Service Co., capital stock \$200; incorporators, W. E. Angler, Mrs. P. M. Angler, D. C. Morrison.

Charleston, W. Va.—Scott Automobile Valve Co., capital stock \$25,000; incorporators, J. R. Scott, William Scott, Harry L. Riggs and others.

Chicago—Henderson Motor Co., capital stock \$1,000; incorporators, Frank L. Childs, H. C. Peterson, D. V. Markin.

Chicago—Electric Auto Sales Co., capital stock \$13,000; incorporators, H. B. Conne, Willie E. Kimble, John E. Sankey, Heyne, O'Connor and Irwin.

Chicago—Glen Motor Car Co., capital stock \$25,000; incorporators, George H. Wilkins, Richard C. Steele, Theo S. McCoy.

Cleveland, O.—Rockefeller Motor Co., capital stock \$10,000; incorporators, P. S. Whitcomb, Sterling Newell, Ellis R. Diehm, R. F. Dennison, Thomas J. Fay.

Detroit, Mich.—Metal Parts Engineering Co., capital stock \$25,000; incorporators, W. L. Kenfield, W. W. McIntyre.

Detroit, Mich.—Warner Detroit Motor Works, capital stock \$100,000; incorporators, Hugh L. Warren, William A. Gleeson.

Detroit, Mich.—Detroit Ball Bearing Co., capital stock \$2,000; incorporators, Joseph Pauer, James Corney and others.

Detroit, Mich.—Internal Gear Drive Co., capital stock \$6,000; incorporators, Albert Mals and others.

East Palestine, O.—National Tire and Rubber Co., capital stock \$150,000; incorporators, C. J. Davis, R. F. Taggart, William Smith, A. E. Albright, John Kennedy Ealing, Jr.

Hondo, Tex.—Hondo Auto Sales Co., capital stock \$2,000; incorporators, Claude W. Gilliam, Charles W. Roberts, O. H. Miller.

Johnstown, Pa.—Standard Automobile and Machinery Co., capital stock \$50,000; incorporators, C. W. Leitenberger, J. W. Leitenberger, B. F. Miller.

Louisville, Ky.—Helical Shock Absorber Co., capital stock \$120,000.

Kansas City, Mo.—Thorp-Allen Motor Co., capital stock \$10,000; incorporators, William R. Thorp, H. B. Thorp, H. L. Allen.

Kings, N. Y.—United States Garage, capital stock \$500; incorporators, Henry D. Bristol, John H. Herman, Jr., Rose Simon.

Los Angeles, Cal.—Machinery and Motor Exchange, capital stock \$10,000; incorporators, C. E. Shaul, T. E. Smith, W. Wantoch, A. Schaffer, R. J. Gardner.

New York, N. Y.—Francis Motor Renting Co., capital stock \$10,000; incorporators, Helen B. Inch, Francis B. Inch, Robert H. Elder.

New York, N. Y.—Commercial Auto Body Co., capital stock \$12,000; incorporators, William Hertz, Casper A. Scheiper, Arthur W. Owen.

New York, N. Y.—Arrowsmith Mfg. Co., capital stock \$10,000; incorporators, Frederick Kalmbach, Albert Kalmbach, John M. Flick.

New York, N. Y.—Sireno Co., capital stock \$5,000; incorporators, George H. Tamlyn, Charles F. Pearce, Walter H. Pearce.

Pass Christian, Miss.—Union Auto Co., capital stock \$5,000; incorporators, J. L. Jones, J. B. Williams and others.

Philadelphia, Pa.—E. Z. Ryde Shock Absorber Co., capital stock \$50,000; incorporators, Frank P. Kessel, Mamie M. Alegre, Lorenzo J. Roll, George W. Griffin.

Pine Bluff, Ark.—Mann Motor Car Co., capital stock \$10,000; incorporators, J. H. Mann, Jr., J. H. Mann, Sr., W. D. Mann.

Pittsburgh, Pa.—Mutual Taxicab Co., capital stock \$10,000; incorporators, Antonia Flocker, C. E. Meyer, M. J. Dain.

San Antonio, Tex.—Auto Owners' Protective Co., capital stock \$10,000; incorporators, B. M. Jamison, Harry W. G. Jage, J. T. Jamison and others.

St. Louis, Mo.—Anselm-Ganahl Motor Car Co., capital stock \$5,000; incorporators, Roy W. Anselm, Leo F. Ganahl and Richard Ganahl.

Salt Lake City, Utah—Grady-Rouche Motor Co., capital stock \$10,000; incorporators, F. W. Rouche, Eugene M. Grady, Grace Bettler Rouche.

Toledo, O.—Griffin Taxicab Co., capital stock \$10,000; incorporators, Sherman B. Coss, C. C. Sampson, Charles E. Thompson, John H. O'Leary, George E. Coss.

Washington, D. C.—Probey-Haynes Motor Car Co., capital stock \$10,000; incorporators, T. Oliver Probey, I. Harry Stuart, W. D. Arrison, J. E. Welch, M. M. Probey.

Washington, D. C.—Water Jacket Heater Co., capital stock \$300,000.

Waterbury, Conn.—East Side Garage Co., capital stock \$5,000; incorporators, Lois S. Phippeney, Robert Cooper, Jennie W. Cooper, William R. Price.

Waterbury, Conn.—Thompson & Bishop, capital stock \$50,000; incorporators, J. Franklin Thompson, Herbert M. Bishop, Clayton L. Klein.

Wilmington, O.—Wilmington Auto Co., capital stock \$10,000; incorporators, Carl S. Bangham, Frank L. Gallup, W. H. Hoskins, W. J. Lewis, Harry McKay, E. T. McPherson, C. D. Pligeon.

Wilmington, Del.—Merchants Motor Express Co., capital stock \$75,000; incorporators, Charles B. Bishop, Clarence J. Jacobs, Harry W. Davis.

Yoakum, Tex.—Universal Motor Car and Supply Co., capital stock \$3,000; incorporators, Otto Wagener, F. L. Klochs, H. Sockamp.

department of the state were \$6815.50 for the same month, of which \$5632 represented new registration fees.

Scheu Invader General Manager—E. A. Scheu, formerly with the Packard Motor Car Co., has been made general manager and sales manager of the Invader Oil Co. of New York.

Sells 247 Cars On Tour—As an aftermath of the Indiana-Pacific coast tour, the Haynes Automobile Co., of Kokomo, Ind., announces that 247 cars were sold en route.

Buys Seat on Board to Sell Cars—To enable him to talk to grain men during business hours, Harry E. Pence, head of the Pence Automobile Co., of Minneapolis, bought a membership in the chamber of commerce at \$4,000. This enables him to go on the floor of the wheat exchange. Pence was always stopped at the door and had to call the man out he wanted to talk to. Now he is able to laugh at the door man.

Wire Wheel Company Formed—The manufacture of wire wheels is to be undertaken in Detroit by a newly organized concern known as the Cameron Wire Wheel Co. The capital stock is \$37,500, of which \$25,000 has been paid in. Those interested in the concern are F. F. Cameron, who several years ago was interested in the making of the Cameron air-cooled motor car in the east; A. A. Leslie and W. E. Carpenter. The Cameron wire wheel is of simple construction and is designed to be applied to existing hubs without alteration, the inner section of the wheel bolting to the ordinary wood wheel flange after the wood spokes

have been removed. The demountable feature is obtained by removing these holding bolts.

Making Dirigible Headlights—William Piggett, O. D. Colvin, Frank T. Hunter and J. C. Burlock have formed a company for the manufacture of a novel device to turn the headlights of a car when the machine is rounding curves and to turn whenever the steering wheel is turned. The company has been incorporated for \$25,000. The device will be called the Pathfinder headlight and is the invention of G. L. Berg of Seattle.

Stevens-Duryea to Enlarge Plant—The Stevens-Duryea Co. is planning large additions to its plant at East Springfield, Mass., that will allow it to more than double its capacity. It is nearly ready to commence construction work and a petition has been filed with the city authorities for discontinuing Cottage street which passes by the factory. In addition to the new buildings a half-mile testing track will be built.

Indianapolis Salvage Corps Formed—It is expected that the Indianapolis Salvage Corps will have its new motor car in operation in Indianapolis in 90 days. Two motor cars for responding to fire alarms, and carrying axes, tarpaulins, etc., are to be purchased. The corps will be maintained by fire insurance interests in quarters provided by the city. The company has asked the city council to pass ordinances giving the corps the right to enter buildings and giving the motor cars of the corps the right of way in answering alarms and a right to travel faster than the legal rate of speed.



From the Four Winds



AURORA May Have Speedway—Motor car owners of Aurora, Ill., are planning a speedway east of that city. A mile track is proposed and the site has already been selected. If the owners of the property will sell at a reasonable figure, the deal will be closed. The land acquired will also be utilized for baseball, football, golf and other sports. A number of prominent citizens are behind the movement.

Qualifies for 200 Club—The first person to qualify for membership in the Two Hundred Club, under rules laid down by E. C. Patterson, of Chicago, in the west is Charles L. Newcomb, Jr., of Denver, consulting engineer for the Sunflower State Oil Co. Mr. Newcomb left the Denver Motor Club at 7 a. m., August 23, in a six-cylinder Lozier with Russell H. Forbes as official observer, and two other passengers. It had rained the day before, so that the road from Denver to Colorado Springs was in rather poor condition, but without stopping the motor, the 222.5-mile trip was completed at 5 p. m.

Mississippi Motorists Boom Touring—Without question the most important motoring event that has transpired in the south this year was the meeting of more than a score of Mississippi tours at Jackson recently. Many of the tours started near the state boundaries and, snowball-like, added to their size as they neared the state capital. Committees selected from Jackson motorists met the incoming tours a number of miles outside of the city and with bunting flying escorted them to the Board of Trade rooms, which were made headquarters for the visitors. Practically all towns of importance in the state were represented. The object

of the gathering was to make motor tours more popular and to promote the good roads movement. More than a thousand cars from out of town points entered the Mississippi capital in the various tours.

Signs at Dangerous Corners—Four hundred signs are almost ready to be distributed and erected at the most dangerous corners in Columbus. The Columbus Automobile Club originated the scheme to label the crossings where street cars cannot be seen until the crossing is reached. The signs will be erected 100 feet on either side of the track. They will be large enough to be seen night and day.

Uses Car as Hoisting Engine—A motor car is being used for hoisting purposes at Grand Cane, La., by Walter J. Hurst, a Shreveport contractor. Mr. Hurst is erecting a building at Grand Cane, and in order to save transportation charges on a hoisting engine, he fitted a pulley to his motor car, which is doing the work in a perfectly satisfactory manner. After the day's work is over Mr. Hurst uses his erstwhile hoisting engine to carry him back to his hotel.

Davenport Cards Race Meet—The Davenport Automobile Club of Davenport, Ia., will stage a big racing card September 21 at its mile track. It has not yet been decided whether the affair will be strictly a club meet or open to outside drivers. There will be eight or nine events, among them several novelty races. The club decided to put on the racing card as a means of raising good roads funds with which the approaches to the Tri-Cities from Illinois and Iowa points will be put in good condition.

Builds Lilliputian Motor Car—What is claimed to be the smallest motor car capable of service on the roads has been constructed by D. D. Churchill, of Spokane, and proved effective in city and country travel. The machine is less than 6½ feet long, and was built at a cost of less than \$250. The highest part of the body of the car is only 3 feet from the ground. The machine is run by a 20-horsepower engine and with four passengers has attained a speed of 25 miles per hour.

John D. Joins Motor Club—Fred H. Caley, secretary of the Cleveland Automobile Club now proudly exhibits to members of the club the personal check of John D. Rockefeller, the newest member of the club, for the yearly dues of \$10. Mr. Rockefeller was invited to join the club last year, but declined on the grounds he had made it a policy not to join clubs. This year, however, in response to a circular letter informing car owners it was not only a privilege but a duty to join, the oil magnate's check was received. He did not say whether he considered it a privilege or a duty.

Model Motorist Is Discovered!—Police of Elgin, Ill., regard C. A. Gifford, of Spaulding as the "model motorist." Arrested for speeding he not only pleaded guilty without quibbling but gave the patrolman who arrested him a choice cigar and informed the magistrate that if the officer had not taken him that he would have been derelict in his duty. "I'm guilty; how much will it cost?" was his query. Informed that it was \$25 and costs, he wrote out a check with rare good nature, informing the justice that he was going at a rate of 25 miles an hour and not a bit slower, and complimented the officer who trailed him on a motorcycle for carrying a correct speedometer. When first arrested he asked to be excused until he

could fulfill an important engagement which necessitated the speedy movement. After a few hours he reported at the police station and paid his fine. His unprecedented reception following his arrest was a shock to the police department, but one which might be copied by others.

Fooled Car Dealers; Arrested—An 18-year-old youth was arrested in St. Louis recently charged with impersonating a prospective motor car purchaser. He was locked up on the complaint of two local agents who said that the youth had been riding around in their demonstrators for a week or 10 days. The youth, who will face a charge of peace disturbance in police court soon, said that he thought he was playing a joke on the dealers by having them believe he would purchase a car after a demonstration.

Waukesha Has Good Roads Day—Mayor Hawley W. Wilbur, the members of the Waukesha Automobile Club, and scores of business men of Waukesha, Wis., 250 in number, on August 26 undertook to emulate the Missouri idea in road improvement, and spent the day, clad in overalls, in hard labor throughout Waukesha county. The 250 road workers were divided into squads and set to work under a boss at various points. Particular attention was paid to the so-called Fifteen-Mile drive, which it is hoped to make a boulevard in time. The road workers were fortunate enough to find farmhouses at noon where a splendid chicken dinner was in waiting. The wives of enterprising farmers were responsible for this feature of the program and did this to repay in a measure for the benefits they will receive from the work.

Recent Club Activities

THE Kenton Automobile Club of Kenton, O., will soon erect about 100 danger signs in Hardin and adjoining counties.

At a recent meeting of the board of governors of the Automobile Club of Hartford, ten new members were admitted to the club. The membership committee has been very active this season.

As the best means of opening formally the Mount Hood road to the Dalles and eastern Oregon, the Portland Automobile Club has scheduled a run to Pendleton.

Secretary Frank D. Pratt, of Elmira Automobile Club, of Elmira, N. Y., has in mind plans for the establishment of a country clubhouse similar to the Buffalo club, only on a smaller scale.

The first important work of the Toledo Automobile Club, recently organized, has been the placing of danger signs at a suitable distance from railway and other dangerous crossings on all roads leading into Toledo. The organization is now figuring on road guides to be placed on all motorways within 100 miles of Toledo. These signs will bear the Toledo Automobile Club insignia, and will point the way to the city.

The Milwaukee Automobile Club officially opened the reconstructed Blue Mound road as far as its club grounds at Cottrell avenue, Milwaukee, on Saturday evening, August 16, with a big jollification. More than seventy-five cars participated in a parade from downtown to the clubhouse, 4.5 miles westward. The Blue Mound road has a concrete roadway 18 feet wide, and with the shoulders of macadam, makes a roadway of 24 to 26 feet wide.

Good Roads Brevities

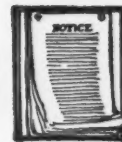
WORK on the Wayne county, Mich., concrete roads has appealed to many students in the University of Michigan, especially those of the civil engineering department. A large number of the students have gained valuable experience in road building during their vacations for the last 2 years.

The Pennsylvania Motor Federation's new road map of the state has been issued and is now being distributed. The new map for the first time shows all the mountains of the state, as well as the roads, and has many roads marked that were not on any of the former maps, besides having more definite information about the condition of roads.

Robert N. Carson, of Iowa City, is boosting the Red Ball route from St. Paul to St. Louis, running through the following towns: St. Paul, Rosemount, Farmington, Northfield, Dundas, Faribault, Medford, Owatonna, Pratt Station, Blooming Prairie, Lansing, Austin, Lyle, Minn. St. Ansgar, Mitchell, Osage, Charles City, Plainfield, Erma Station, Waverly, Janesville, Waterloo, Ia. Washburn, La Porte, Mt. Auburn, Vinton, Shellsburg, Palo, Cedar Rapids, Ia. Western, Shueyville, Curtis, North Liberty, Iowa City, Ia. Riverside, Alnsworth, Crawfordsville, Wayne Station, Olds, Swedesburg, Mt. Pleasant, Ia. Oakland Mills, Salem, Houghton, La Crew, Donnellson, Charleston, New Boston, Mt. Clare, Moorar, Keokuk, Ia. Hamilton, Sutter, Ursa, Quincy, Ill. Marblehead, Hannibal, New London, Frankford, Toll House, Louisiana, Calumet, Rocky Ford, Prairieville, Auburn, Troy, Moscow Mills, Flint, Wentzville, Dardenne, Cottleville, St. Charles, Pattonville, St. Louis, Mo.



Brief Business Announcements



Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make
Blencoe, Ia.	Wm. Girman	Ford
Boston, Mass.	Fred A. Loud	Westcott
Burlington, Va.	Clifton C. Daigle	Chandler
Canton, O.	Standard Motor Car Co.	Chandler
Columbus, O.	Johnston Sales Co.	Herreshoff
Columbus, O.	Johnston Sales Co.	R. C. H.
Columbus, O.	Gwinn Sales Co.	Lozier
Columbus, O.	Jacob Renner	Richmond
Coshocton, O.	Charles W. Loos & Sons	Overland
Davenport, Ia.	Walter E. Priester	Overland
Dow City, Ia.	H. W. Huston	Ford
Hartford, Conn.	Palace Auto Service Co.	Oldsmobile
Henderson, Neb.	A. D. Peters	Ford
Houston, Tex.	James C. Clinton	Chandler
Indiana, Pa.	Clymer Motor Car Co.	Chandler
Lima, O.	B. A. Bleck	Chandler
Logan, Utah	G. F. Thatcher	Chandler
Lynn, Mass.	Ernest Whitten	Chandler
Manchester, N. H.	Howard E. Johnson	Chandler
Marshall, Mo.	Blosser Bros.	Cole
Meridian, Miss.	Henry White	Stearns
Minneapolis, Minn.	Regal Sales Co., Inc.	Partin-Palmer
Minneapolis, Minn.	Stimson Automobile Co.	Monarch

Town	Agent	Make
Minneapolis, Minn.	White Garage	Herreshoff
Minneapolis, Minn.	Satterlee-Fosness Co.	Pope-Hartford
Moline, Ill.	J. H. Bushong	Chandler
Morristown, N. J.	William Stevenson Garage Co.	Chandler
Norfolk, Va.	H. H. Johnson	Chandler
Oran, Mo.	C. & A. J. Mathews	Cole
Portland, Ore.	Northwest Auto Co.	Cole
Portland, Ore.	Northwest Auto Co.	Reo
Postville, Ia.	O. J. Blessin & Co.	Chandler
Randolph, Ia.	Leslie O. Ross	Ford
St. Louis, Mo.	Maxwell Motor Sales Corp.	Maxwell
St. Louis, Mo.	Grand Motor Car Co.	Auburn
St. Louis, Mo.	Grand-St. Louis Auto Co.	Ford
Seward, Neb.	Fred Zimmerer	Ford
Springfield, Mass.	E. V. Stratton Co.	Hudson
Tiffin, O.	R. W. Glick	Maxwell
Utica, N. Y.	Skinner Motor Car Co.	Chandler
Washington, D. C.	Emerson & Orme	Apperson
Washington, D. C.	Emerson & Orme	Detroit
Winner, S. D.	A. K. DeWolf	Ford
West Union, Ia.	Booth & Probert	Chandler
Worcester, Mass.	Eaton-Brewster Co.	Vellie

COMMERCIAL CARS

Town	Agent	Make
Worcester, Mass.	Eaton-Brewster Co.	Vellie
Boston, Mass.	R. & L. Co.	Willys Utility

Town	Agent	Make
Springfield, Mass.	E. V. Stratton Co.	Stewart
Minneapolis, Minn.	Armstrong Transfer Co.	Menomonie

ALBANY, ORE.—S. H. Clevenger & Son have opened a motor car repair shop in Albany.

Los Angeles, Cal.—A. S. Robinson has been made manager of the Pacific Kisselkar branch in Los Angeles.

Seattle, Wash.—W. H. Kirby has been made general sales manager for the Harmon Motor Car Co. in Seattle.

Providence, R. I.—Wallace L. Wilcox & Co., Franklin dealers, are now occupying new salesrooms at 320 Broad street.

Seattle, Wash.—H. J. Fulton has been appointed northwest district manager of the Hudson Motor Car Co., with headquarters in Seattle.

Baltimore, Md.—The Franklin Motor Car Co., distributor of the Franklin here, has moved to North Eutaw street, between Preston and Biddle streets.

Grand Rapids, Mich.—The owners of the Auto Tire and Vulcanizing Co. and C. E. Graham have organized the Auto Shop, and have leased the building at 11 Island street.

Newburyport, Mass.—Carl S. Walker has been appointed manager of the Ford branch at Newburyport, Mass., to succeed Sidney Ashe, who resigned to go into mercantile work.

Philadelphia, Pa.—Headquarters of the V. P. Padula Motor Co., local distributor of the Havers and the Abbott-Detroit, has been removed from 2037 Market street to 152 North Broad street.

Bangor, Me.—Ellis Y. Eldredge, who has been assistant cashier of the Second National Bank at Bangor, Me., has been elected manager of the Bangor Motor Co., succeeding Byron W. Austin.

Chicago—Tennant Motor, Ltd., 2447 Michigan avenue, has been appointed local sales agency for the National, formerly represented here by E. C. Divine. Tenant Motor, Ltd., retains the Simplex agency.

Syracuse, N. Y.—Through increased business the Syracuse Rubber Co. has leased the five-story brick building next to its present location. Doorways will be cut through from each floor and the additional floor space, combined with an increase in the number of

salesmen, will make this the largest accessory house between New York and Chicago.

Minneapolis, Minn.—Randles Bros., 1704 East Franklin avenue, have invented a motor car ice box, 10 inches wide, 12¾ wide and 12¾ high. Twenty-five pounds of ice will last 24 hours in the box.

Columbus, O.—The Ohio Auto Brass Co. is the name of a new motor car repair shop established at 115 West Vine street, Columbus, O. The concern repairs lamps, radiators, windshields, fenders and tanks.

Syracuse, N. Y.—Permits for the erection of five garages throughout the city were granted last week by the bureau of building to S. M. Blauthin, Harvey Smith, J. Goppelt, Howard M. Kimmey and F. C. Lowery.

Minneapolis, Minn.—F. H. Satterlee and Kenneth Fosness have formed the Satterlee-Fosness Co. to handle Pope-Hartford cars and Quaker tires. They will open a garage at 213 Sixth street, where they will do repair work and sell supplies.

Seattle, Wash.—The Hornberg Automobile Co. recently moved into its new garage at First avenue and Adams street. The Harry L. Olive Co. is about ready to move into its new building in the same block. The building is considered one of the most modern garages in the west.

Janesville, Wis.—T. W. Richards and J. Snyder have formed a partnership under the name of R. S. Perfection Plating Co. and established a shop at 117 Dodge street, Janesville, Wis. They will do work for the numerous industries in Janesville as well specializing in small work on motor cars.

Minneapolis, Minn.—H. E. Pence, president of the Pence Automobile Co., is to build a motor car storage warehouse which he expects to be the largest in America. He will build it under the name of Equitable Automobile Warehouse Co. The contract was let last week for \$50,000, the warehouse to be completed November 1. The building will be 222 feet front on Washington avenue and on Great Northern and Burlington trackage and 150 feet deep on Eighth avenue. The building will be two stories in height and will hold 2,000 cars through a double deck arrange-

ment, by which each floor will accommodate two tiers of machines. The Pence company will use part of the storage and will rent the remainder.

Boston, Mass.—The Republic Motor Co., of Massachusetts, having the agency for the Chevrolet and Little cars, has just changed its name to the Chevrolet Motor Co. of New England, owing to the consolidation of the two companies in Detroit. There has been no change in local management.

Milwaukee, Wis.—A \$25,000 garage building will be erected at Broadway and Martin streets, Milwaukee, by the Ticonic Investment Co. The building has already been leased to the Hoppe-Hatter Motor Co., Milwaukee, which is state distributor for the Chalmers and the Rauch & Lang electric.

Lake Geneva, Wis.—O. E. Romare has sold his Lake Shore garage opposite the Hotel Geneva to S. T. Hutchinson, owner of the Badger garage, and will establish a similar business at Williams Bay, Wis. The two Lake Geneva garages are close to each other and Mr. Hutchinson will use both in his business.

Seattle, Wash.—W. A. Wicks, Franklin dealer here, has moved into new quarters in a new fire-proof, concrete building at the corner of Twelfth avenue and East Union street. The showroom has a sixty-foot frontage on Twelfth avenue and forty feet on East Union street. A complete repair shop adjoins the salesroom.

Chicago—With the appointment of Harry M. Newman as local branch manager, the Moon Motor Car Co. of Illinois starts a vigorous sales campaign. The concern has moved from its former salesrooms at 2728 Michigan avenue to larger quarters at 2612 Michigan avenue, formerly occupied by the Lozier company.

Milwaukee, Wis.—The Goodyear Rubber Co. of New York, a New York corporation, has filed articles and a statement to do business in Wisconsin as a foreign corporation. The Wisconsin interest is given at \$25,000. J. H. Suydan is Wisconsin manager. The company has a branch at 380 East Water street, Milwaukee, and is Wisconsin distributor for the G & J brand of United States tires.

Accessory Offerings

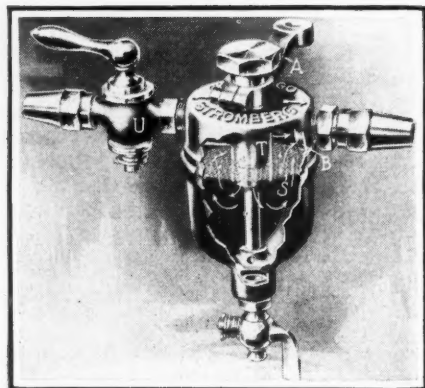


FIG. 1—NEW STROMBERG STRAINER TO GIVE CLEAN GASOLINE

New Stromberg Strainer

WITH the present-day gasoline in the form of "a liquid with solids in suspension" it is quite a difficult matter for carburetors to do their work properly. Like human beings, they must be clean to be efficient, and one of the most disagreeable troubles met with is dirt or water or both in the carburetor.

To overcome this difficulty the Stromberg Motor Devices Co., Chicago, has brought out a fuel strainer, which is illustrated in Fig. 1. This device is placed in the gasoline line, between the tank and the carburetor. Gasoline may flow through it in one direction only and the small arrows show that direction. The fuel is made to enter the strainer at the right through the union U, then through the tube T into the sediment chamber. The path is shown by arrows. The gasoline rises in the sediment chamber and in so doing passes through a wire screen and out through the tube B.

In its path the gasoline has left behind, in the sediment chamber, all dirt and water and these, being heavier than gasoline, drop to the bottom of the chamber, from which they are to be drained periodically. In order not to cause any undue strain on the gasoline line the Stromberg strainer is rigidly attached by the arm A to some part of the chassis, preferably the frame or a crossmember. The maker is selling this device at \$2.50 and when installed a small extra charge is made for labor.

Autolock Switch

That motor theft has risen in the past few months is evidenced by the fact that at least six new devices have come to the market for its prevention and one of the latest of these is the Autolock, a product of the Blackburn Specialty Co., Cleveland, O. The device appears in the form of an ignition switch lock, the switch being operated by a key in the same way that the ordinary kick switch is used. In Fig. 2

is shown the lock installed on a coil box and, as will be noted, the position battery, magneto and off are marked as in the ordinary form of switch. The lock and key is of Yale make, and when the owner expects to leave the car standing unattended he is supposed to take the key with him after it has been turned to the off position. The key cannot be removed except when the current is broken or when in off position, and it is stated that it is impossible to short-circuit the wiring. The selling price of the Autolock is \$5.

Attwood Gasoline Filter

To prevent dirt and water from entering the carburetor and thus causing poor engine operation, the Attwood Brass Works, Grand Rapids, Mich., has brought out the Attwood gasoline filter, which is

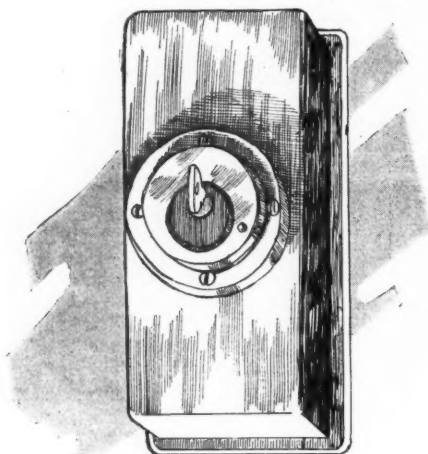


FIG. 3—ATWOOD GASOLINE FILTER SHOWING PATH OF FUEL

shown in Fig. 3. This device is installed in the gasoline line between the tank and the carburetor and in its action is as follows: The fuel enters the filter at A and follows the path designated by the arrows to the chamber B.

Here all heavier-than-gasoline substances will drop to the bottom and the lighter liquid suitable for fuel will pass through a filter gauge and special cloth to chamber C and thence out through the opening at the side to the carburetor. Periodically the petcock at the bottom of the device is opened and any sediment and water permitted to run out. The maker states that no special tools are required to take the filter apart should this be necessary. The selling price of the Attwood filter is \$2.

Neverleak Top Covering

The F. S. Carr Co., Boston, Mass., has brought out a waterproof covering for motor car tops which has a number of desirable features. The fabric has the appearance of grain leather, the surface coating being of rubber of special composition. A second lining, making the fabric doubly

waterproof reinforces the first. It is stated by the maker that the outer covering may be scraped off and still the fabric remain waterproof. The F. S. Carr company is giving an unlimited time guarantee with this covering, stating under any circumstances should the top made of their covering leak new material will be furnished.

Billings & Spencer Display Board

Billings & Spencer, Hartford, Conn., is offering dealers a display board of wrenches. The board has upon it only those styles which have been proven to be in demand. The distributors state that the prospective purchaser will be impressed with the sight of 234 wrenches of different sizes. The board is designed to be placed in a convenient position behind the counter or to stand on the floor. A card is furnished also which gives the number, bolt size and milled openings of the wrenches. By special arrangement with the Billings & Spencer Co., dealers may obtain the board free.

A New Decarbonizer

The Northwestern Chemical Co., Marietta, O., has added to its line of compounds for the motorist a new decarbonizer under the name of Carbonox. This the maker claims is thorough in its action but not injurious to the engine. It is in the form of a liquid, and according to the maker, is not intended to dissolve the carbon itself, but dissolves the charred oil which holds the flakes of carbon together and to the metal of the cylinder. By destroying this oil the carbon is left in a loose flaky condition to be blown out with the exhaust. It also may be used to clean spark plugs, rusty bolts, etc. The quart size sells for 75 cents.

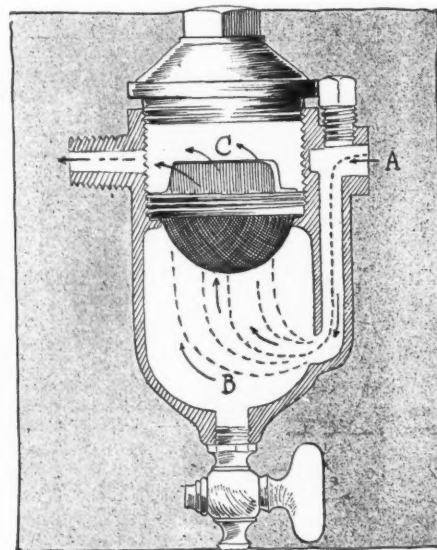


FIG. 2—AUTOLOCK SWITCH DESIGNED TO PREVENT THEFT

COLE. The Standardized Car On Its Transcontinental Tour

was equipped with a

STROMBERG

CARBURETOR

"The Accepted Standard"

Read What
Cole's Chief
Engineer
Says—

WESTERN UNION NIGHT LETTER

THEO. N. VAIL, PRESIDENT

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STROMBERG MOTOR DEVICES CO.,

CHICAGO, ILL'S

PUBLICALLY DISSECTED STROMBERG ON COLE SIX TRANS CONTINENTAL TEST CAR
WHICH HAD NOT BEEN ADJUSTED SINCE LEAVING INDIANAPOLIS. OUR HOT
WATER JACKETED INTAKE MANIFOLD A BIG SUCCESS WITH YOUR CARBURETOR
ESPECIALLY IN MOUNTAINS AND HIGH ALTITUDE. GASOLINE STRAINER ANOTHER
GOOD FACTOR FROM OWNER VIEW. ABSOLUTELY NO CONDENSATION ON TRIP

C. S. CRAWFORD,

220 AL 5th

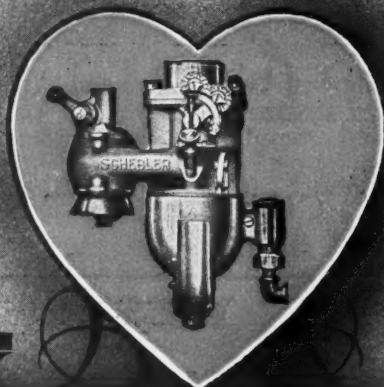
CHIEF ENGINEER COLE MOTOR CAR CO.

This car left later and traveled more miles
per day than any other car on the trip.

These Results with a STROMBERG Type "G"—
The Six Cylinder Carburetor.

SCHIEBLER

*The Aristocrat
of Carburetors*



"The Heart of the Automobile"

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"Pioneers in Perfection" of Carburetion

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STANDARD CARBURETOR OF THE WORLD

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Service Department

Distributors

Every city and town in
the United States and
Canada • Europe and
• Australia •

IF A CAR IS KLAXONIZED the manufacturers say so. In their advertisements, or in their catalogues.

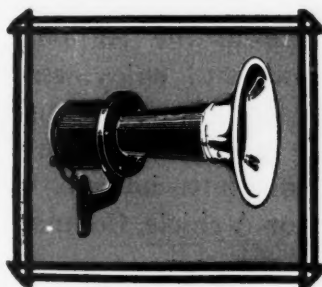
When the car's list of equipment contains simply the words "electric horn" the chances are the horn is a "buzzer." Knowing the bulb-horn is no good and out of date, car manufacturers have sought the cheapest way in which they can say "electric horn" - taking the chance that you won't look too carefully at it until the car is sold.

If, however, you have driven a car and know the difference between the "buzzer" and the motor-driven signal - then the car agent has to furnish you a Klaxon before you will take the car.

58 CAR MAKERS believe that this is short-sighted policy. They supply the Klaxon in the first place.

A. E. C.	Davis	Mors (European)	S. & M. "Six"
Alco	F. I. A. T.	Multiplex	Schneider (European)
Armleder	Havers "Six"	National	S. G. V.
Autocar	King	Nyberg	Simplex
H. H. Babcock	Kissel	Oakland	Stafford
Benz	Knickerbocker	Ohio "Six"	Staver
Borland Electric	Knox	Oldsmobile	Stearns
Broc Electric	Lancia (European)	Packard	Sternberg
Buffalo Electric	Locomobile	Peerless	Stevens-Duryea
Roadster	Lozier	Peugeot	Stoddard-Dayton
Century Electric	Marmon	Pierce-Arrow	Touraine
Charon (European)	Matheson	Pope-Hartford	Walker Electric
Chicago Electric	Maxwell "Six"	"Six"	Ward
Columbia	Mercedes	Pratt	White
Croton	Metallurgique	Rambler	Winton

ON other cars, look carefully at the "electric horn." See if it has a name. Often-times not only has the name-plate been removed but the horn itself has been placed under the hood - out of sight. See if the name means anything to you except what the agent says about it; or if you ever heard of it before. Ask him for a Klaxon - the signal you know about, - and see that he supplies one. He will do it rather than lose the sale of the car.

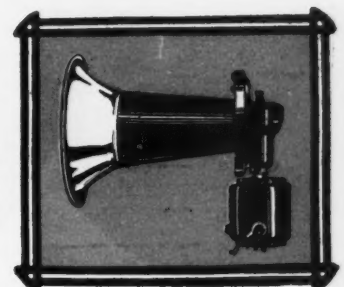


KLAXONET

Lovell-McConnell Mfg Company Newark, N.J., U.S.A.

KLAXON

"The Public Safety Signal"



KLAXON

This advertisement done in the Klaxon Factory on the Klaxon Press with Klaxon type especially designed by F. W. Goudy.



**Now Is The Time To
Order Your Closed Car
For Fall And Winter.**



OUR wide range of exclusive styles gives you an individual closed car—made to order, as it were.

TRUE artists have produced rare beauty and convenience, accompanied by luxurious comfort for our discriminating patrons.

TO the National car's heritage of flexible power, noiseless operation, and reliable performance is added an opulence of refinement and a wealth of beauty. The control of our closed cars is simplicity itself.

EVERY one of our closed cars are so perfectly complete in every detail that to attempt to mention them separately detracts from their harmonious effect produced for your warm, restful motoring.

IT costs you no more to ride in the National's atmosphere of supreme comfort and enjoyment—don't delay. Order now and be sure that your Coupe or Limousine will be ready for you by the first cold wave. Let us send you complete information. Simply address National Motor Vehicle Company, Indianapolis, Indiana.

When Writing to Advertisers, Please Mention Motor Age.



*A Continued
Story—
Chap. 5*

*Concluded
Next Issue*

!XX-? !!--DXXXQ ?? !XX!

There goes that fool Jones, giving me the laugh—and, good lord, there comes Smith!

Watch me pretend to be looking at my tires.

Wouldn't let those idiots know I've been cranking this old scow the last half hour—they both have those new-fangled electric crankers.

Gosh—wait 'till I get hold of the smart agent that sold me this hand cranker—I won't do a thing to that guy.



Storage Battery

Write us for full information.

WILLARD STORAGE BATTERY CO., Cleveland, Ohio

New York Branch: 136 W. 52nd St.

Chicago Branch: 2241 Michigan Ave.

Detroit Branch: 1191 Woodward Ave.

San Francisco Branch: 243 Monadnock Bldg.

Indianapolis Branch: 438 and 439 Indiana Pythian Bldg.

Depots in all Principal Cities in the United States and Canada.

S5

That a high grade Power Tire Pump is an absolute necessity is evidenced by this editorial from August 21st Motor Age.

NUMEROUS tire difficulties suggest the necessity of some form of power tire pump and, in fact, no tourist should start on a trip extending over 5 days without equipping with some form of pump. It is too expensive for the motorist to use the hand pump for inflating large size tires on a vacation trip. Motorists who think otherwise must reckon the cost, which is invariably much more than the mere expenditure of physical energy which in itself is all right. Inflating one large tire with a small hand pump often is sufficient to disturb the mental equanimity of an owner for an entire day. Not infrequently more disastrous results follow in that the overheated driver exposes himself to chills which may result in bodily disorder. The power pump not only solves the difficulty but saves time and insures the tire being inflated to the proper running pressure.

THERE are many car owners who would like a power pump but do not know of a method of installing on their particular make of motor. This question is of such vital importance that manufacturers of motor cars should give attention to the subject in motor design. The power pump is only in its infancy; it will be in universal use in a few years. It is quite absurd to see all the attention devoted to electric lighting, quickly-operated lighting devices for gaslights, electric or pneumatic gear shift and yet leave the question of tire inflation alone. This is too important to be passed over in this manner.

Manufacturers of the better cars have adopted the Kellogg Pump in preference to all others for the past five years, a record no other pump maker can boast of.

Hudson Dealers, Attention!

Kellogg Four Cylinder Pump equipment for 1914 Hudson Cars now ready

Write for Particulars

Kellogg Manufacturing Company
Rochester, N. Y.

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San Francisco
444 Market Street

Chicago
1112 So. Michigan Ave.



HOLLEY

CARBURETOR

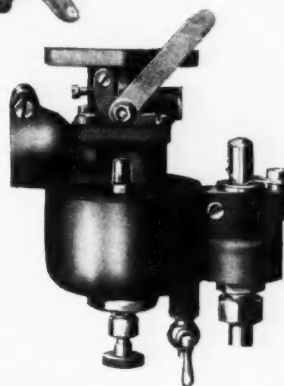
It took us two years

To convince the automobile public that the new self-adjusting no-moving-parts Holley carburetor was the efficient, economical mixing device that we claimed it was, but repeated tests with competitive outfits have finally demonstrated beyond question of a doubt the truth of our claims that the Holley carburetor, although the most expensive, is the most economical and efficient mixing device with which an automobile can be equipped.

The result is, that over half the gasoline motor cars built in America during 1913 were equipped with the new self-adjusting, no-moving-parts Holley.

This output amounts to over 215,000, which is more than the combined output of gasoline automobile carburetors made by all the other companies.

1914 demonstration outfits are now ready. Please let us have your specifications early.



HOLLEY BROTHERS CO., 131-141 Rowena St., Detroit

REO ACCESSORIES CO. 1220 Michigan Ave., Chicago, Ill. OMAHA RUBBER COMPANY Omaha, Neb.
FOREIGN BRANCH: Holley Bros. Company Coventry, England

Holley Carburetors are carried in stock at CHAS. E. MILLER, Home Office: 97-103 Reade Street and 121 Chambers Street, New York

BRANCHES:

New York City.....924 Eighth Ave.	Hartford, Conn.....274 Trumbull St.	Detroit, Mich.....227-229 Jefferson Ave.
Between 54th and 55th Sts.	Atlanta, Ga.....66 Edgewood Ave.	Cleveland, O.....1829 Euclid Ave.
New York City.....2782 Broadway	Brooklyn, N. Y.....1421 Bedford Avenue	Philadelphia, Pa.....318 No. Broad St.
Between 107th and 108th Sts.	Buffalo, N. Y.....824 Main Street	New Orleans, La.....601-603 Baronne St.
Springfield, Mass.....Bridge and Dwight Sts.	Albany, N. Y.....135 Central Avenue	Newark, N. J.....274 Halsey St.
	Boston, Mass.....202-204 Columbus Ave.	

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Cox Oxygen Carbon Cleaner

For Garages and Service Stations

The modern method for removing carbon from the cylinder by the oxygen process. Write us for the most interesting circular you ever read.

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870 WOODWARD AVE., DETROIT, MICH.

By Thomas H. Russell,
M. E., LL. B.

Author of "Ignition, Timing and Valve Setting," "Automobile Motors and Mechanism," "Motor Boats: Construction & Operation."

CONTENTS

Automobile Driving—General Instructions—Starting the engine—Advancing the spark—How to change speeds—Use of the Clutch—The Control levers—Principle of gear changing—The engine as a factor—Use of brakes—Causes of irregular firing—To avoid side-slip—The tire bill—Gear missing in speed changes—Engine thumping—Driving on the brake—How to get the best work out of a motor—Skidding or side-slip.

Self-tuition in driving, Continued—The initial trip—Charging tanks—Starting the engine—Manipulating the control—Correct mixture—Changing gear—On the top speed—Withdrawing the clutch—Coasting slopes—Picking up the Drive—Driving on the reverse—Entering and leaving the garage—After the drive—Road risks.

Another lesson in driving—Learning the steering and Control—Preliminary attention to car—Starting—Changing speed—Coasting, braking and reversing—Sources of side-slip—To avoid skidding—Non-slip devices—Choice of Track—Speed Limits—Conduct in emergencies—Driving through city traffic—Meeting horses, cattle and cyclists.

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Involuntary stops—Causes and remedies.

Automobile DRIVING Self-Taught



PRICE.
FLEXIBLE
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An exhaustive treatise on the management, care and operation of Motor Cars. Pocket size,

230 pages

liberally illustrated, handsomely bound in black seal flexible leather, round corners, red edges.

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Care and maintenance of motor cars—Private housing—The garage—Cleaning—Lubricating—Care of tires.

Care of a car on a tour—Engine treatment—Overhauling the ignition apparatus—Accessories and tools for the tour—Stabling the car.

Laying up a car—Cleaning the engine—The transmission gear—Connections and chains—The lubricators—Tire treatment—Laying up for the winter.

Gasolene—Its properties and Economical Use—Production of Gasolene—Its distillation—Specific gravity—Vaporization experiments—Proper design and function of the carburetor—The ton mileage method of arriving at economy—Quality of the fuel.

Gasolene hints and tips.

Operating mechanism of a modern car.

Choice of a car, etc.—Considerations of price and cost of maintenance—Small and large cars—New and tried types—Second-hand cars—Change speed gear—Various forms—Selective sliding gears—The Panhard and Mercedes systems—Gate control mechanism, etc.

Don'ts for motor car drivers and tire owners.

The Ten "Specialists" in Motor Car Lifting

This line of jacks represents a complete study and mastery of every lifting requirement that can be encountered with every make and model of pleasure car or power truck.



The development of this line as it now stands makes stronger than ever the long-recognized exclusive standard of

GENUINE DUFF-BUILT

BARRETT AUTOMOBILE JACKS

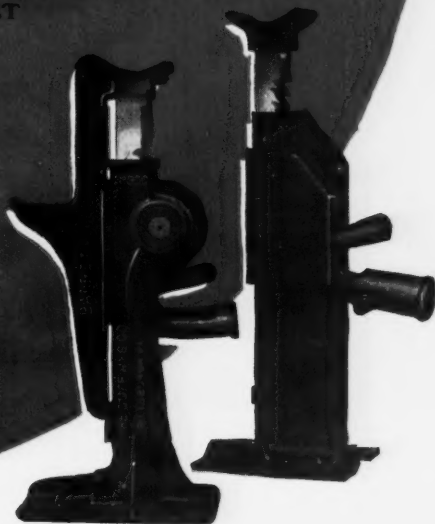
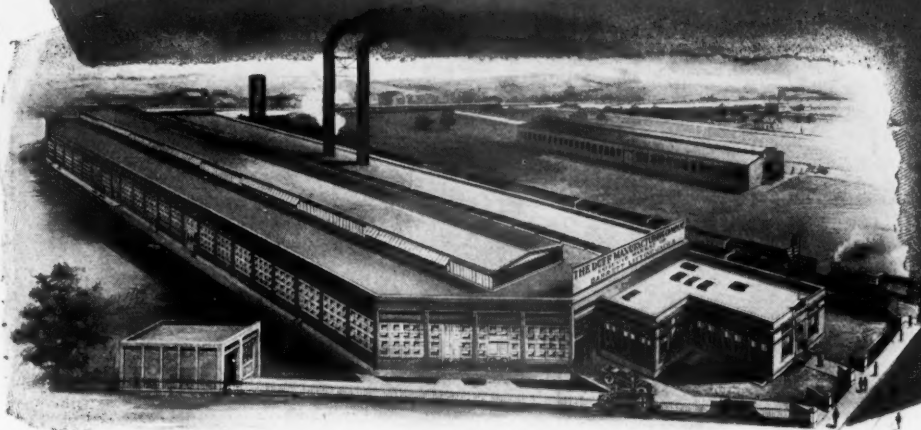
The manufacturer in selecting his jack equipment and the dealer in selling jacks at retail, can do the motorist no better service than to see that he gets the special Barrett best suited to his car. The expense can be but *slightly* greater—the added safety, efficiency and durability being out of all proportion thereto. A noteworthy feature of this Company's activities has always been the high standard of its manufacturing organization, plant and equipment. Its present plant, new this year, is not only the largest jack manufactory in the world, but is one that cannot be excelled for ideal equipment and working conditions in any industry.

Prompt service on all estimates, orders and correspondence from manufacturers or dealers.

THE DUFF MANUFACTURING COMPANY, PITTSBURGH, PA.

Established 1883

NEW YORK OFFICE: 50 CHURCH STREET



When Writing to Advertisers, Please Mention Motor Age.

Willys Utility Truck

$\frac{3}{4}$ Ton

30 horsepower motor
120-inch wheelbase
56-inch tread
New Splittorf magneto
Schebler model R carburetor
Front tires 34 x 4½ inches,
pneumatic

\$1250

(Chassis only)

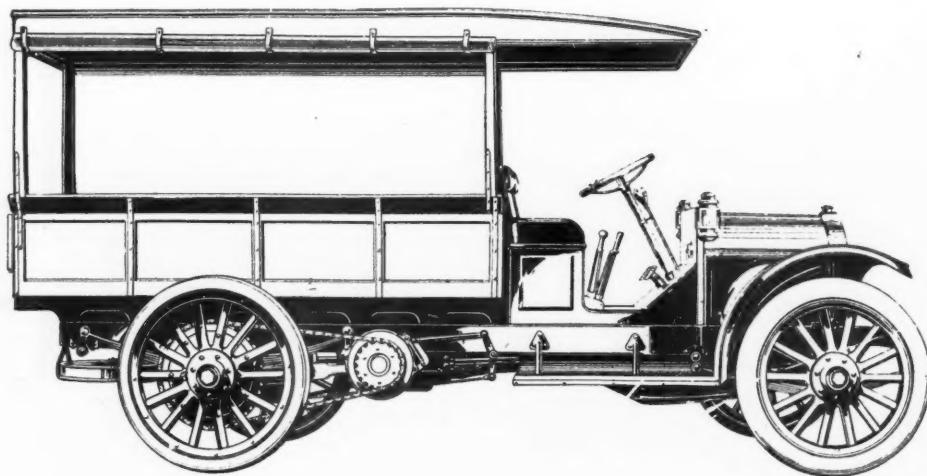
Rear tires 36 x 3½ inches, solid
3-speed transmission
Double chain drive
Double expanding and contracting
brakes
Loading space, 48 x 96 inches
Capacity, 1500 lbs.
Complete equipment

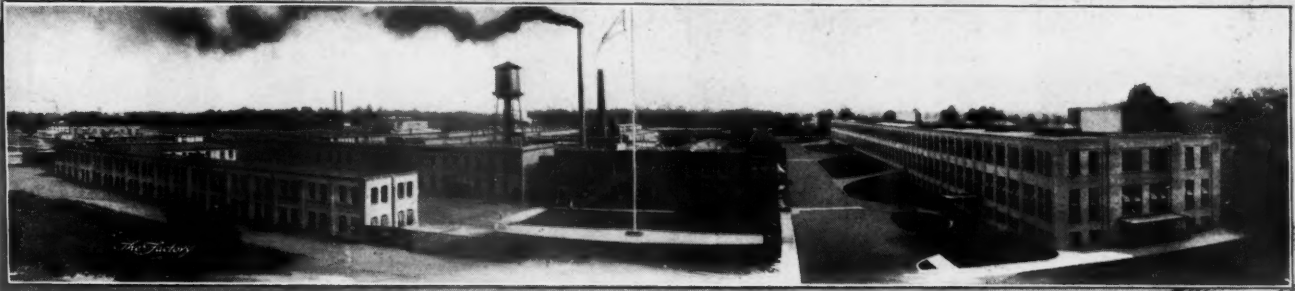
This is the lowest priced truck of its
size and capacity on the market

WE are making immediate
deliveries. Correspondence invited from bona-fide
and responsible dealers.

Literature on request. Please address Dept. 162

The Willys-Overland Company
Toledo, Ohio



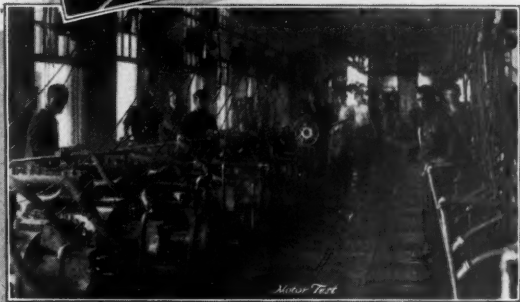


Established 1880

Incorporated 1899

OLDS MOTOR WORKS

Lansing, Michigan.



Oldsmobile
1914 *Loading Platform*

\$2975 for a Six Cylinder Oldsmobile \$2975

Lower in price, and even higher in quality, than any of its predecessors—the Model 54—1914 Oldsmobile is creating more concrete evidence of live dealers' interest than any other high grade six on the market.

The Price

\$2975 practically eliminates competition with dealers handling cars priced from \$4000 to \$5000—for the Oldsmobile is as good as any of these. The lines of this car are of distinctive Oldsmobile design—a standard which has led all competition, whatever the price.

We Are Six Cylinder Pioneers

Oldsmobile pioneered the six cylinder motor, and it is unnecessary to dwell on the value of the years of ripe experience in the manufacture of six cylinder cars—which is back of Model 54. The Oldsmobile unit power plant 3 point suspensions (bore, 4 1/4; stroke, 5 1/4) is a wonderful piece of machinery. In performance and appearance it meets every and all requirements, and astonishes the experienced motorist with its marvelous flexibility and power. Words cannot adequately portray its many good qualifications.

Matters of Comfort, Utility and Refinement

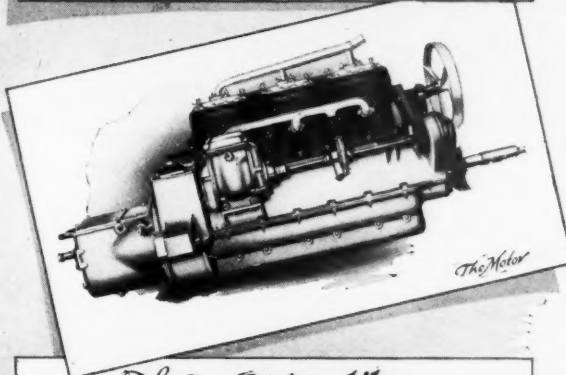
We learned how to build comfort into the Oldsmobile in the early days of the industry. If we knew of any better equipment or little matters of refinement than are on the Model 54 we would be the first to install them. But we have put everything into this car that spells utility, comfort and refinement.

Prompt Deliveries

Never in the history of this Company have we been so well prepared to take care of our dealers by prompt shipment of cars as ordered. We began the delivery of our new models August first, and each day sees the regular quota of cars coming through the factory, tested and inspected down to the minutest detail, on schedule time. You can absolutely count on all delivery promises being adhered to rigorously.

Write Us at Once

In a short while orders for all cars available for the coming season will be closed, and we shall be unable to go beyond this point. We urge, therefore, that if you wish to sell a car that measures up to the highest standards of quality, workmanship and design, you write us at once, letting us know your prospects, size of territory desired, and your facilities for properly representing the Oldsmobile line.



Four- or Five-Passenger Phaeton, Touring Body Type, \$2975. Seven-Passenger Touring Body, \$175 Extra. Limousine, \$4300

OLDS MOTOR WORKS

LANSING, MICHIGAN

HUP

The 1914 Hupmobile is in the hands of Hupmobile distributors.

We believe this new Hupmobile to be the *best* car of its class in the world.

By *best*, we mean best in internal essentials, especially. We mean best in those things which make for long life and continuous service at lowest cost.

But we believe you will also pronounce it the *most beautiful* car of its class in the world.

We believe we have put *more money into the chassis* than any car of its class in the world.

We base these beliefs on our conviction—

That the production of this new Hupmobile incorporates a greater tonnage of *high grade steel* than any car of its class in the world;

That this new Hupmobile is the *largest user of aluminum*—without regard to class or price—in the world;

That the frame used in the new Hupmobile is the *costliest piece of pressed steel construction* used by any car of its class in the world;

That the Hupmobile long-stroke motor will *outpull any engine* of its class in the world;

That the Hupmobile *pressed steel body*—designed by us and built by the builders of Pullman cars—is the *costliest body* used by any car of its class in the world;

That Hupmobile *springs* utilize a greater tonnage of *costly steel*—more than 2,000 tons—than any other car of its class in the world;

That Hupmobile bearings—Timken and Hyatt—are the best in the world; one whole Hyatt building being devoted to Hupmobile bearings.

We repeat—for readiness; for ruggedness; for smartness of style; for fineness of finish; for daily work on the road; for extremest economy—we believe this new Hupmobile to be the best car of its class in the world.

Details of the 1914 Hupmobile

Long-stroke, small-bore motor; cylinders cast en bloc, with enclosed valves; three bearing crankshaft, hollowed for circulation of oil; chain drive for magneto and cam shaft; unit power plant with multiple disc clutch; full floating rear axle; hood harmonized with body, without abrupt break at the dash; gasoline tank under the scuttle dash or cowl—These are Hupmobile features which were new to the American market when the present type Hupmobile was introduced almost two years ago.

They are standard in the Hupmobile for 1914; many of them have been adopted by other American manufacturers; and a forecast of the 1914 European models published July 3 in "The Automobile"—the recognized authority—shows that nearly all of them are included in the latest Continental productions. More than that, they remain Hupmobile standard because, in nearly two years of service, they have demonstrated their worth. The body is unchanged, save for minor detailed improvements. The back of the front seat, in

the touring car, is upholstered; the doors are upholstered, with pockets, and given a more substantial appearance.

A rain-vision, ventilating windshield replaces the present type, though still hinged at its point of attachment to the car, so that it can be lowered forward if desired.

The capacity of the gasoline tank is increased approximately three gallons.

Oversize tires—33x4-inch—will be regular equipment for the \$1200 car; also demountable rims, one extra rim and rear tire carrier, which clamps the rim without touching the rubber casing.

An electric horn, concealed under the hood, is included in the equipment. The horn button is at the center of the steering wheel.

Electrical starting and lighting are accomplished by the Westinghouse two unit system—separate generator and starting motor—with independent magneto ignition. Thus the ignition is not cut off in case accident should befall the generator, nor is the starting motor dis-

abled for like cause, having the battery's store of electricity on which to operate—an advantage not found in systems where all electrical functions are centered in one machine.

The six-volt starting motor is practically built into the Hupmobile engine.

By means of a pedal convenient to the driver's left foot, a gear is shifted into engagement with a gear on the flywheel. The same motion of the operator's foot that engages the gears also closes the starting switch, and the starting motor is revolving slowly before the gears engage, thus greatly facilitating the operation.

The electric lighting equipment includes two headlights, with 16-c. p. bulbs adjustable for focus, and combination electric and oil side and tail lamps.

Current for the lamps is drawn direct from the generator, except at very low speed on high gear; so that the battery current is used only for the starting motor. The generator automatically keeps the battery up to full charge at all times.

Hupp Motor Car Company, 1228 Milwaukee Avenue, Detroit, Michigan

SPECIFICATIONS

"32" Touring Car or Roadster—\$1050 f. o. b. Detroit

Four-cylinder long-stroke motor, 3¼x5½ inches; unit power plant. Selective type transmission, sliding gears. Center control. Full floating rear axle. 106-inch wheel-base. Tires, 32x3½, Q. D. Rear shock absorber. Magneto rain shield.

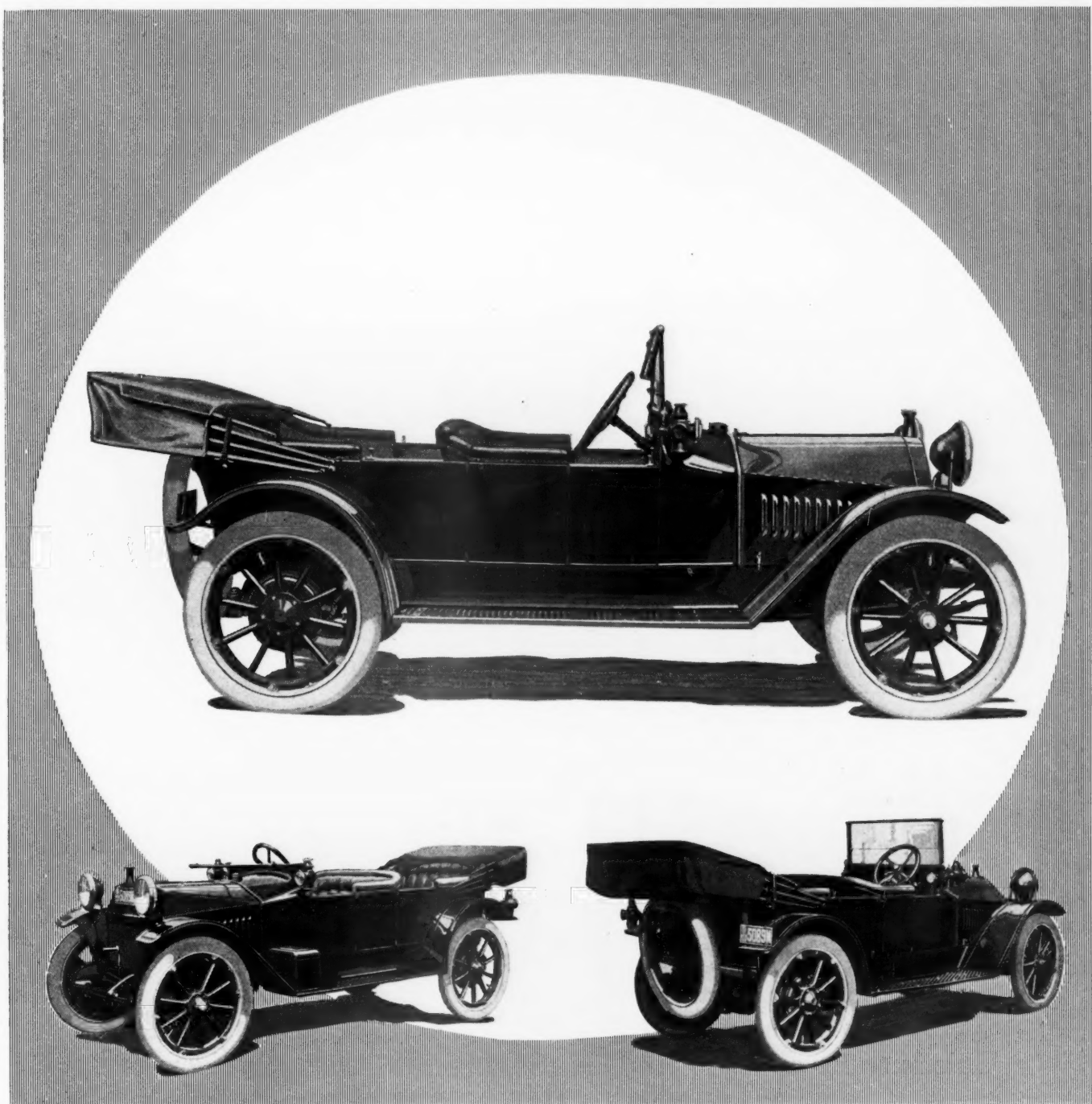
Equipment—Electric horn; rain vision ventilating windshield; mohair top with envelope; Hupmobile Jiffy curtains; speedometer; cocoa mat in tonneau; Prest-O-Lite; oil lamps; tools. Trimmings, black and nickel.

"32" Touring Car or Two-passenger Roadster with Westinghouse two-unit electric generator and starter; electric lights; oversize tires, 33x4 inches; demountable rims, extra rim and tire carrier at rear—\$1200 f. o. b. Detroit.

The car of The

When Writing to Advertisers, Please Mention Motor Age.

mobile



American Family

When Writing to Advertisers, Please Mention Motor Age.



The Vulcan Electric Gear Shift on the

HAYNES

America's First Car

is a greater feature than the self-starter

Grab it! Don't make the mistake of waiting until you've seen whether it makes good. It's bound to make good. It's mechanically a success. We proved that before we adopted it. It fills a bigger need than the starter. It's an improvement that has already created more interest and comment than the self-starter or any other great feature of the past.

**Dealers who sold the first self-starter cars saved
hundreds of dollars in salesmanship
and made a clean-up**

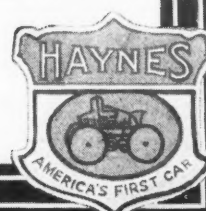
The self-starter put the fortunate cars which were first to use it in a class by themselves. People were wild to see the cars with the new device. They sought out the salesrooms of the local dealers and practically dropped their orders into the dealers' laps.

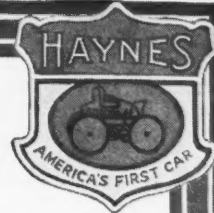
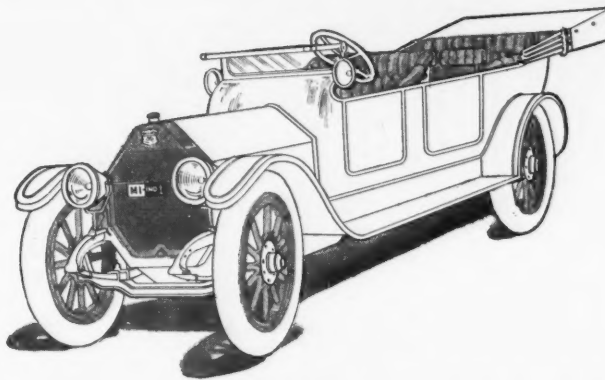
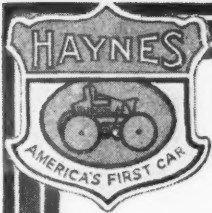
**Where are the dealers who said the self-starter
wouldn't make good?**

When the news spread through the automobile trade, not so many months ago, that a device had been invented to start automobile engines, some dealers got busy and arranged for big orders of the improved cars. Others said: "The device may not work. We'll wait and see." They missed the great benefits which accrued to the dealers who had the sale of cars equipped with self-starters.

**This is to be an Electric Gear Shift year, like last year was
an electric-starter year**

What are you going to do about it?





Model 27—136-in. wheelbase, 6 cylinder, 7 passenger body. Price, \$2785

HAYNES

America's First Car

with the Vulcan Electric Gear Shift is the season's big selling hit

The Haynes has always been a distinctive car—a car of great prestige and reputation—continually a leader in the adoption of fundamental improvements and betterment features. It has always been a strong car for the dealer who was awake to the selling opportunities at his command.

The Electric Gear Shift gives Haynes dealers a great chance

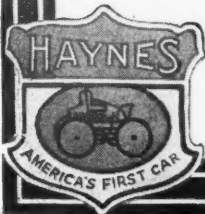
All that was true of the self-starter as a selling influence will be true in double measure of the Electric Gear Shift. This feature added to a strong selling proposition in every other way—as you'll see from the table of specifications—puts the Haynes dealer in an enviable position. There may yet be the opportunity for a Haynes dealer in your town.

The strongest line-up of features ever embodied in a motor car

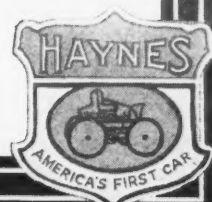
Motor—Bore 4 1/4 in., Stroke 5 1/2 in. L-head Haynes. Cylinders cast in pairs. Model 26, A.L.A.M., 43.35 H. P., Dynamometer 65 H. P. Model 27, A.L.A.M., 43.35 H. P., Dynamometer 65 H. P. Model 28, A.L.A.M., 29.9 H. P., Dynamometer 48 H. P.
Weight—Model 26, 3800 lbs; Model 27, 4000 lbs; Model 28, 3400 lbs.
Cooling—Centrifugal pump and pressed steel fan.
Wheel Base—Model 26, 130. Model 27, 136. Model 28, 118.
Ignition—American Simms Magneto.
Carburetor—Stromberg.
Lubrication—Splash and gravity feed.
Control—Left hand. Vulcan Electric Gear Shift.
Transmission—Selective Type, three speeds forward, one reverse.
Steering Column—Worm and worm gear type.
Clutch—Haynes contracting steel band.
Rear Axle—Full Floating Timken on Models 26 and 27; McCue, Model 28, Gourney Bearings.
Front Axle—I-Beam. O. H. steel heat treated.
Wheels—Artillery type. Funk demountable rims.

Tires—Models 26 and 27, 36 x 4 1/2 Model 28, 34 x 4
Springs—Front Semi-elliptic 30 1/8 x 2, rear 48 x 2.
Brakes—15 1/4 external and 15 internal Models 26 and 27. 12 and 16 internal on Model 28.
Finish—Indiana dark blue body. Pacific Tour Gray, optional.
Gasoline Feed—Pressure. Automatic feed.
Upholstery—Buffed leather—deep cushions.
Starting and Lighting—Leece-Neville electrical system.
Cowl-board Equipment—Electric lights, sight oil feed, automatic cut-out for generator, dash light, auxiliary air pressure pump, air gauge, speedometer. Models 26-27 have rim wind clock.
Other Standard Equipment—Top, top cover of silk mohair, mechanical tire pump, rain vision ventilating wind-shield, Vulcan electric gear shift, two large electric headlights, electric side lights, electric tail light, electric starter, generator, 12 volt, 80 ampere hour storage battery, speedometer, horn, coat and foot rails, tire irons, full tool equipment, one extra demountable rim and Collins curtains. Models 26 and 27 have shock absorbers.

Hand lever shift optional, all models, at \$200 reduction.



The Haynes Automobile Company
2 Main St., KOKOMO, IND.



When Writing to Advertisers, Please Mention Motor Age.

Continental Motors

America's
Standard



The Motor of Today

Continental
6-P
1914 Model

This is one advertisement

in a series that is helping to sell cars Continental equipped. Watch them and keep posted.

We are telling the American public who motor or use motor trucks, the importance of the motor in the car and the dominating position held by the Continental.

This is benefiting car maker and dealer who build on the firm foundation of Continental Quality and Prestige.

It is creating a demand for Continental equipped cars which will make them doubly strong in 1914—the crucial year.

Get the jump on competition — specify Continental.

A Product of Evolution

The fittest survive—the weaklings and the hybrids perish. Through the operation of this law grows civilization, literature, science,—the race.

In the making of automobiles, the product of this law of nature is called the "standard" car. It is the car of today. And the most vital factor in its success is the motor—a unit representing nearly one quarter of the cost of the finished product.

More than sixty makers of motor vehicles have seen the coming of the car of standard parts—made by specialists. They are building on the solid foundation of the Continental Motor—America's standard—the motor of today.

For into this famous motor goes the combined knowledge of the engineering staffs of these sixty odd builders as well as of our own capable corps, specialists who for ten years have dreamed and wrought nothing save Continental Motors. Such motors are the permanent type—the fittest.

For the coming year more than 40,000 new Continental Motors have been specified. Engineers known as leaders to every American who reads, willingly stake their professional reputation on the acknowledged pre-eminence of the Continental motor—the motor of today.

Their reputation is your guarantee of unfailing service in the motor they endorse.

1912

1909

1906

1903

Continental Motor Mfg. Company

Largest Exclusive Motor Builders in the World

Factories: Detroit and Muskegon, Michigan

Detroit, Michigan

When Writing to Advertisers, Please Mention Motor Age.

Monarch

ANNOUNCEMENT

Full five-passenger touring car, long stroke motor, 25 horse power, 110 inch wheel base, gasoline in dash, selective sliding gears, bell backed body, quick detachable rims, 32 x 3½ inch tires, complete equipment, wire wheels, electric self-starter and lights.

\$1050

F. O. B. DETROIT

With all the Qualities of a Leader

The new Monarch will be ready for delivery in September. Look at the car and note the specifications. Was there ever an automobile more appropriately named Big, beautiful—it has no contenders to the place of leadership in its field. It possesses the attributes of distinction. Feature upon feature, found only in the higher priced cars, will surprise and delight the man who is looking for a car around \$1000.

Nothing in the low price field approaches the beauty of Monarch design. The stream line body with its original method of using the Renault hood gives it lines of grace and beauty unexcelled by the elite of motordom.

FULL FIVE PASSENGER BODY

Exceptional roominess both in the fore seat and in the tonneau, deep upholstery and full elliptic springs provide the utmost comfort under all conditions. It's a full five-passenger car with so much leg room in the tonneau that a foot rail is necessary.

ECONOMICAL OF FUEL

The motor is designed to give plenty of power for rough road or steep hill travel, yet to keep the gasoline consumption down to the minimum. A small bore, long stroke motor of the twin cylinder type assures great power and absolute reliability.

CONVENIENT DRIVING

No feature for convenient driving is omitted. A foot throttle and foot brake are on the toe board. There are also a hand brake within easy reach, a hand lever throttle and spark control both on the steering wheel. An efficient electric system operated from the seat starts the motor and supplies electricity for five lights.

DEALERS—HAVE YOU ITS EQUAL?

Can you offer your buying public so much real automobile value as shown by the Monarch? No—This sets a new standard of value—a value that will arouse the enthusiasm of every person who sees the car.

WRITE FOR ILLUSTRATED ADVANCE CIRCULAR

MONARCH MOTOR CAR COMPANY

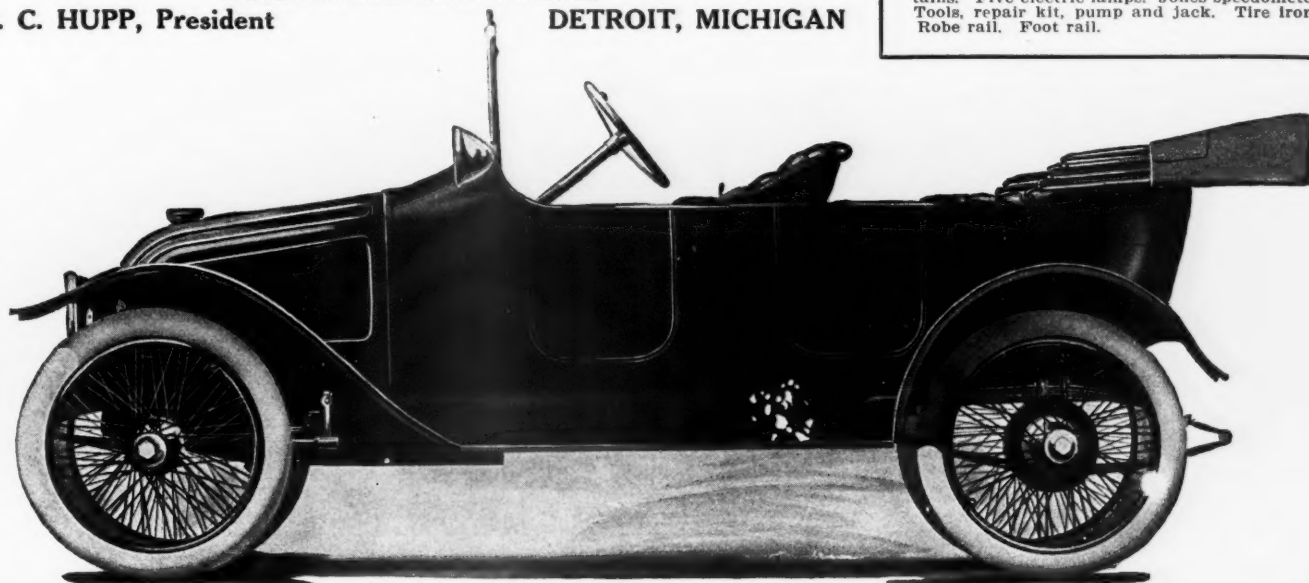
JEFFERSON AND BALDWIN AVES.

R. C. HUPP, President

DETROIT, MICHIGAN

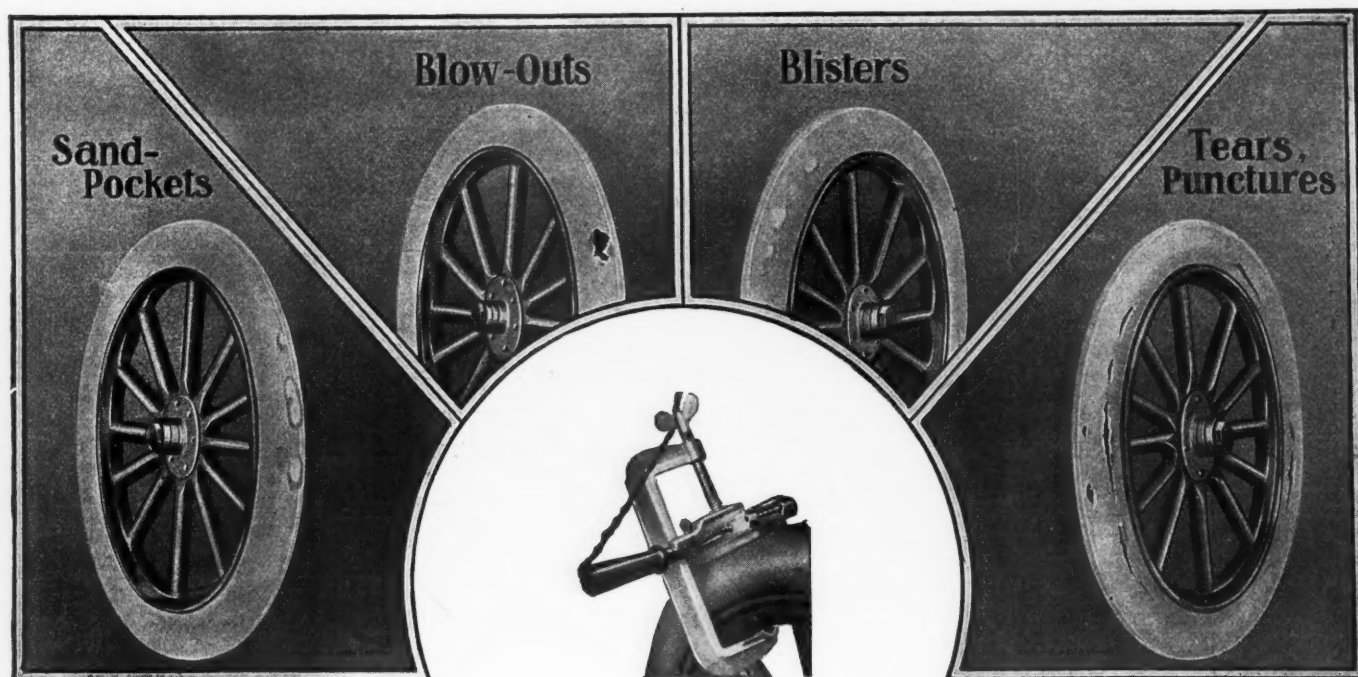
Read These Specifications

PRICE—\$1,050.00—f. o. b. Detroit.
MOTOR—25 H. P. cylinders—4. (3 3-16 inches x 5 inches) cylinders cast in pairs—water cooled —Thermo syphon—4 cycle—3 bearing crank shaft.
RADIATOR—Under hood and forward.
CARBURETOR—Float Feed.
IGNITION—Magneto.
STARTING—Electric.
LIGHTING—Electric.
LUBRICATION—Force feed (to time gears and front and rear main bearings).
CLUTCH—Cone, leather faced.
TRANSMISSION—Selective sliding, separate unit.
SUSPENSION—3 point, motor and transmission mounted on tubes.
SPEEDS—Three forward and one reverse.
DRIVE—Shaft, not enclosed. Double universal joint type.
REAR AXLE—Extra strong, semi-floating (bevel drive).
BRAKES—Two sets on rear hubs, external contracting and internal expanding 12 x 2 inches, extra large surface.
TIRES—32 x 3½.
RIMS—Quick Detachable.
STEERING—Left hand, irreversible, 18 inch steering wheel.
CONTROL—Center lever, operating on transmission direct.
BODY—Torpedo type, stream line, full five passenger with fore doors.
SIGNAL—Electric horn.
WHEEL BASE—110 inches.
SPRINGS—Rear full elliptic, swivelled on bottom and hung under axle. Front semi-elliptic.
WHEELS—Wire wheels.
FRAME—Pressed steel.
GASOLINE—Under cowl on dash, capacity 10 gallons.
EQUIPMENT—Clear vision, rain vision windshield. Extension top with famous "Jiffy" curtains. Five electric lamps. Jones speedometer. Tools, repair kit, pump and jack. Tire irons. Robe rail. Foot rail.



Full five passenger touring car—completely equipped \$1050

When Writing to Advertisers, Please Mention Motor Age.



Motorists: *End your tire troubles*

Seventy-five per cent of tire expense comes from neglected casing cuts. Seal those cuts permanently before dirt and water get in to rot the fabric; and your tires will run until the tread rubber is **WORN** through. You always know that the fabric is sound—ready to give maximum service. You're relieved of the delay and inconvenience of changing tires that blow out when you're on a **PLEASURE** trip.

SHALER ELECTRIC VULCANIZER

with temperature controlled *Automatically*

Easy and safe for you or your chauffeur to operate. When you see a cut in your tires, fill it with raw rubber—furnished with the outfit—clamp on the vulcanizer, plug into any electric light socket and in fifteen minutes you have a repair that will outwear the tire. No watching or regulating required. The temperature of the vulcanizer is held at exactly the right degree by a thermostat that automatically turns the current off and on as required.

The Shaler mends tubes, too, as perfectly as any garage could.

You can't expect tires to take care of themselves. Help them a little and treble their mileage.

There are Shalers for every requirement—prices \$2.00 to \$20.00.



Get this tire book **FREE**

Care and Repair of Tires contains descriptions of the best tire-saving appliances and emergency repair kinks. Tells how the Shaler Vulcanizer will save you money and make you independent of repair shops. Will send you one copy free—postpaid—if you fill out and return the coupon. Get busy, the edition is limited.

C. A. SHALER CO., 236 4th S., Waupun, Wis.

Name.....
Address.....

C. A. SHALER CO.
236 Fourth Street
Waupun
Wis.

Braender Tires

Win Again at
Elgin, Ill.



302 MILE ROAD RACE

Anderson in STUTZ—First Place
Mulford in MASON—Second Place

WITHOUT TIRE CHANGE

The BRAENDER Tires that Mulford used in ELGIN RACE were the same set of tires used by him in the 302 mile race the day before and with which he won two races at GALVESTON, MAKING A TOTAL OF OVER 900 MILES, at an average speed of over 70 MILES PER HOUR.

Responsible Dealers ONLY wanted for unoccupied Territory. Write for Particulars.

BRAENDER RUBBER & TIRE COMPANY

AGENCIES

3302 Grant Boulevard, Pittsburg, Pa.
1467 S. Michigan Ave., Chicago, Ill.
409 N. Capital Ave., Indianapolis, Ind.
J. R. Johnson, Greenwich, Conn.
330 W. 29th St., Baltimore, Md.

MAIN OFFICE AND FACTORY Rutherford, N. J.

465 Fulton St., Troy, N. Y.
W. B. Shelp Rubber Co., Houston, Tex.

Sears Auto. Co., Des Moines, Ia.
P. Stevens, Lake Placid, N. J.

BRANCHES

1987 Broadway, N. Y.
1211 Bedford Ave., Brooklyn, N. Y.
Ocean Ave., Seabright, N. J.

MERCER

A Consistent Winner

A 300 cubic inch Mercer, driven by Ralph De Palma, won the 302-Mile Cobe Trophy Race at Elgin, Ill., Aug. 29, at an average speed of 66.8 miles per hour. This is the third consecutive year the Mercer has won the 300-inch division of the Elgin races.

The winning of one race, or even several races, does not necessarily indicate that any particular car possesses superior qualities from a speed and utility viewpoint. Consistency, continued participation in racing, and the comparative merit of a car's performance is what proves its claim to championship honors.

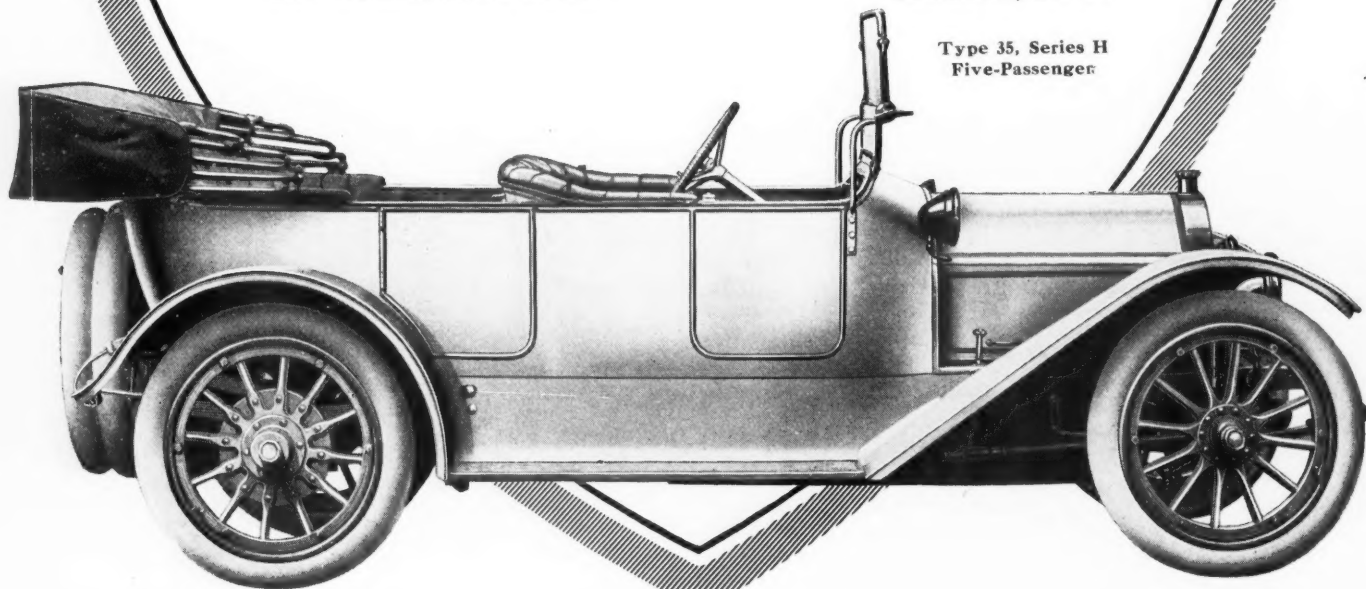
The Mercer record for the past three years speaks volumes.

There is no greater asset for the dealer
than the car's actual performance. Think
what Mercer victories mean to Mercer dealers

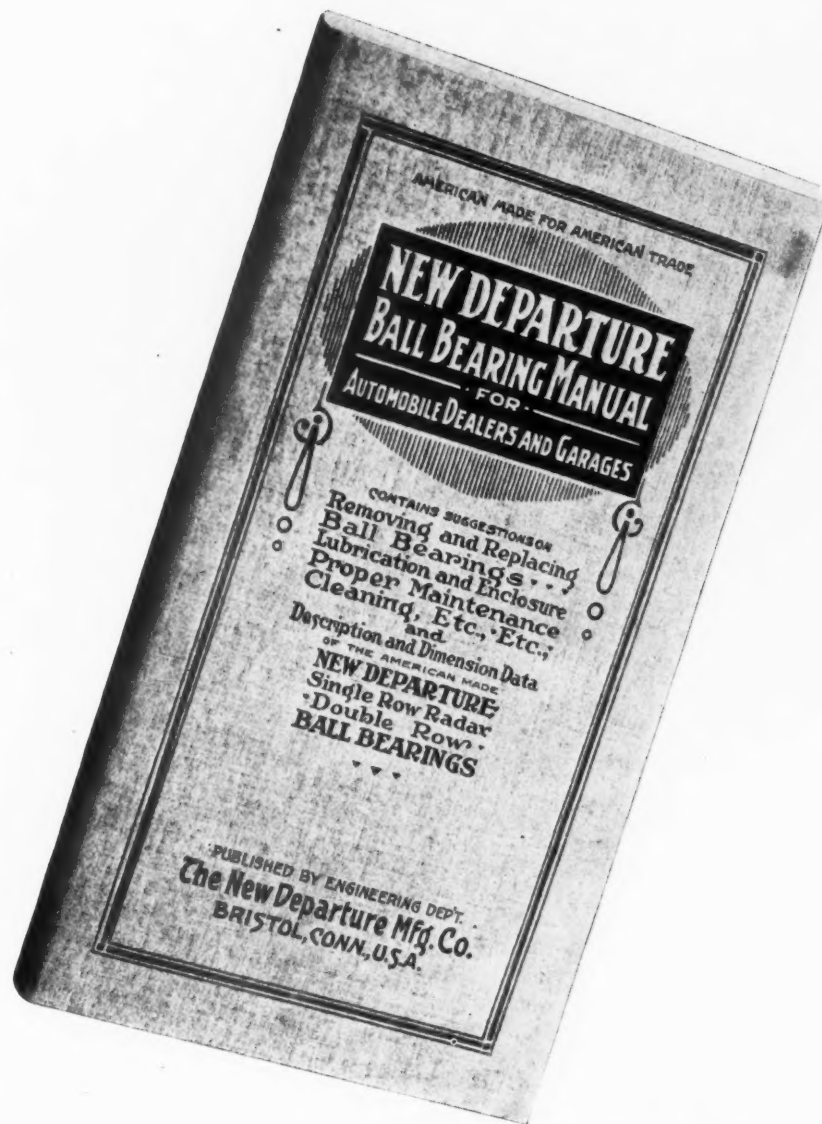
Write today regarding unallotted territory

MERCER AUTOMOBILE COMPANY
800 Whitehead Road Trenton, N. J.

Type 35, Series H
Five-Passenger



When Writing to Advertisers, Please Mention Motor Age.



To Automobile Dealers and Garage Men

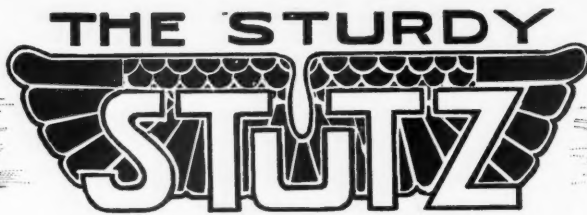
THIS BOOK IS PARTICULARLY FOR YOU—

This book is for you, particularly—full of practical suggestions on the proper methods of removing and replacing ball bearings, cleansing, lubricating, inclosure, maintenance, etc., etc., prepared by our engineers. It is a REAL manual and is worth real money to you. We will send it free if you address your request to

DEPT. L

The New Departure Mfg. Company, Bristol, Conn.

Western Branch, 1016-17 Ford Building, Detroit, Michigan



MADE GOOD IN A DAY

Stutz value is as consistent as its performance

The foundation of Stutz success has been built on that fundamental principle of successful motor car construction—*sturdiness*.

Its reputation—made in a day—was due to the splendid quality of all its parts and superior mechanical principles.

Although Stutz success is directly traceable to its sound construction, yet its power, simplicity and beauty have been contributing factors.

No important mechanical change has been made in the new Stutz Series "E" Car. Just a few details have been altered which make it sturdier than ever before, insure even greater service and power to its owners.

The Stutz has everything you want in a motor car

The Electric Starting, Lighting and Ignition systems employed in the Stutz are separate units, thus eliminating any chance of complication. The self-starter is so

simple that a child can understand it. It works quietly and certainly. Electrical experts regard our installation as the simplest and, therefore, the best on the market.

A glance at the Stutz specifications, some of which are shown at left, will explain the foundation upon which its wonderful record for endurance was built.

Stutz touring and roadster models in four and six-cylinder cars show some

pleasing innovations. Their extreme beauty is matched only by the generosity of dimensions and comfort.

And, finally, Stutz price is fully justified. Stutz cars are manufactured under the watchful eye of Harry C. Stutz, their designer. Stutz cars have had no bad years—the company was immediately successful—its stock is not watered. Stutz value is as consistent as its performance.

We have prepared a simple booklet containing illustrations and detailed specifications of our Series E Models. Compare any car at any price with the Stutz—on paper and on the road—and you'll soon learn where to make a certain investment in motor car satisfaction.

The best car for the individual is the best car for the dealer. We appreciate letters for information from both sources. Write for the new Series E Catalog, No. A-2.

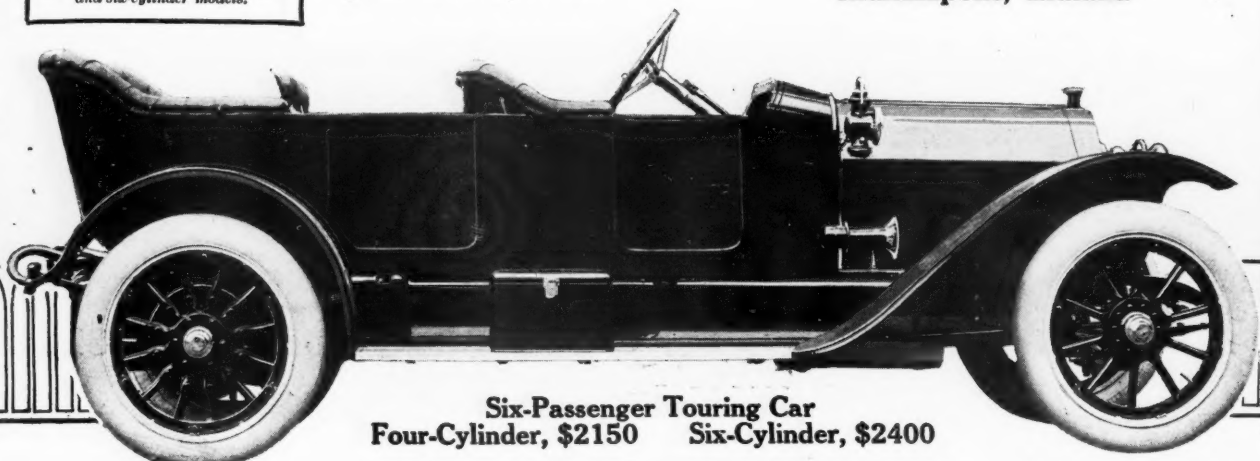
Stutz Motor Car Co.
Indianapolis, Indiana

Stutz Features

A Digest of the Peers

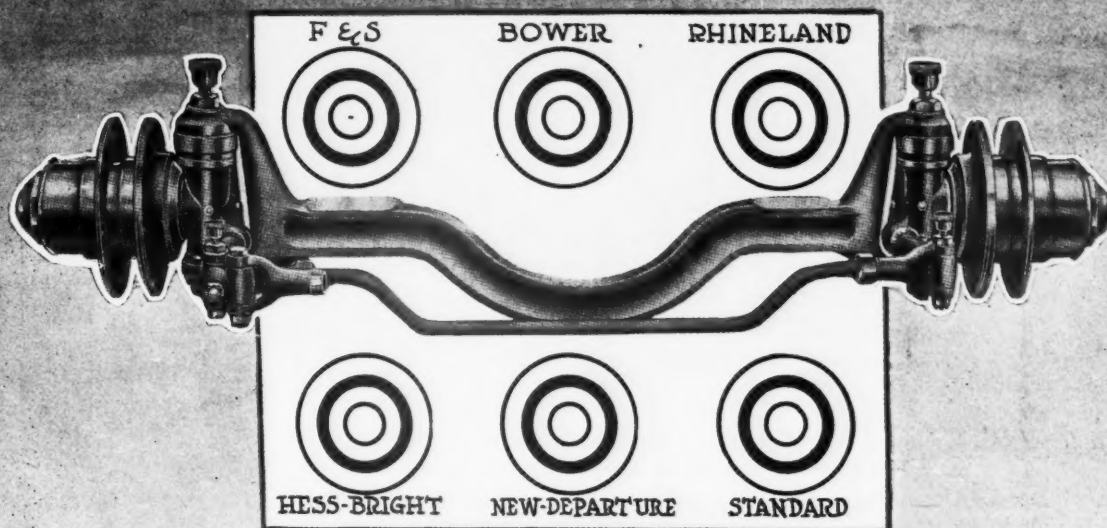
- 1 Dependable Electric Starter.
- 2 Lighting System—Remy electric generator with storage battery
- 3 Cone clutch
- 4 4½ x 5½ T-head motor in 4-cylinder models; 4x5 T-head motor in 6-cylinder models
- 5 Stutz special rear system
- 6 Timken front axle
- 7 Gemmer steering gear
- 8 Force feed oiling system through hollow crank shaft.
- 9 Tires 34 x 4 1-2.
- 10 Black and nickel trimmings throughout.

Stutz Cars are made in both four and six-cylinder models.



Six-Passenger Touring Car
Four-Cylinder, \$2150 Six-Cylinder, \$2400

When Writing to Advertisers, Please Mention Motor Age.



The **AXLE WITH your CHOICE** *of the* **FINEST BEARINGS**

For years Sheldon Truck axles have been the undisputed leaders in the field. But we realized that to attain supremacy is one thing; to maintain it is another.

Every Sheldon Axle which leaves our factory is of unvarying perfection.

We are continually striving to improve and perfect wherever it is possible to do so.

In line with this policy we offer to you the choice of the following leading bearings—the best and finest produced in the world:

Standard Taper Roller Bearings,
Bower Straight Roller Bearings,
New Departure,
Rhineland,
Hess-Bright,
F & S,
S. K. F.,

Fafnir,
S. R. O.,
R. B. F.,
Schafer,
Norma Roller,
R. I. V.

Or single row in any type desired.

We leave the manufacture of bearings to the specialist and make the axles as well as infinite care and unlimited experience can make them.

SHELDON AXLE COMPANY
WILKES-BARRE, PA.

Chicago Office:
68 E. 12th St.

San Francisco Office:
444 Market St.

Detroit Office:
1215 Woodward Ave.

"—And there isn't
a penny of expense
after it is installed."

THE BOSTON STARTER

FOR FORD CARS

If you **should** be inclined to pay \$200 for an electric or acetylene starting outfit not only would you have an exorbitant first cost to pay (in proportion to the price of the car) but there would be continual expense for charging batteries, keeping gas tanks full, etc.

The **BOSTON STARTER** for **FORD CARS** is a mechanical starter that doesn't cost a cent to keep in operation. A simple pull on the handle located on the dash transmits the energy to the motor, turning it over instantly. The entire device is located beneath the hood—and doesn't alter the appearance of the car in any particular. It is easily installed by any practical motorist, and gives all the utility and convenience of gas or electric starters without the worry and expense of their up-keep.

You should have it on **your FORD CAR**. It is the simplest, most reliable and most practical starting device ever offered to **FORD** owners.

Write today for our literature.

AUTOMATIC APPLIANCE COMPANY

172 Columbus Avenue

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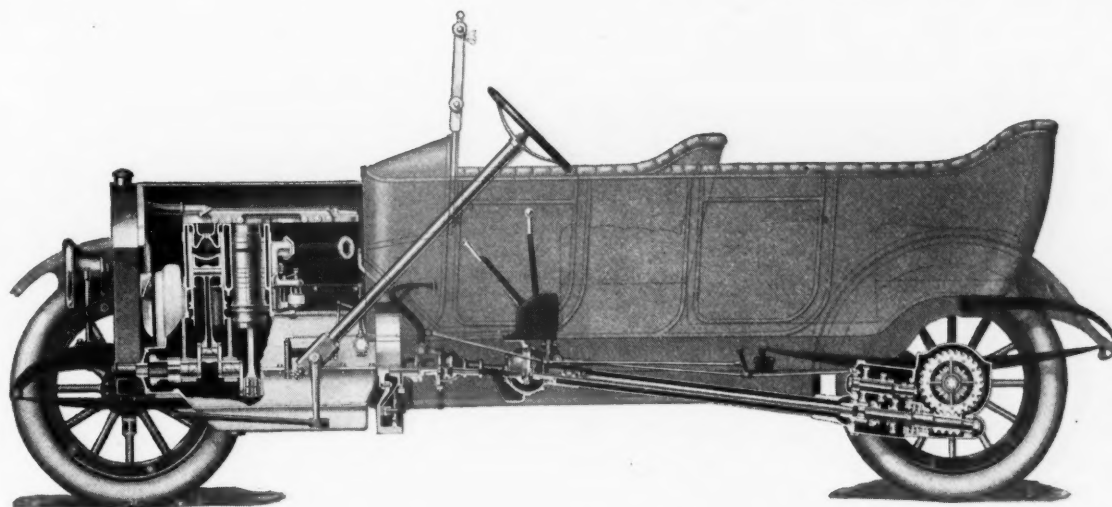


When Writing to Advertisers, Please Mention Motor Age.

**Five Passenger
Touring Car,
\$2900**



Lyons-Knight
"THE CAR OF SILENCE"



Specifications

Engine—Lyons-Knight, four cylinder, four cycle, $4\frac{1}{2}$ inch bore, $5\frac{1}{2}$ inch stroke, water cooled.

Horsepower—50.

Oiling—Lyons-Knight pressure feed to all bearings, pistons and sleeves, regulated in accordance to engine power.

Carburetor—Improved double jet, especially designed, with adjustment on steering column.

Ignition—Dual, water-proof, high-tension magneto.

Clutch—Three plate, raybestos faced.

Transmission—Silent, selective, three-speed, sliding gear type embodied in rear axle housing.

Driving Gear—Worm drive, silent, smooth and always efficient in operation.

Rear Axle—Full floating, Timken bearings.

Brakes—Two sets, double acting, internal and external on 16" rear wheel drums.

Wheel Base—130 inches, tread 56 inches.

Wheels—Wood with quick detachable, demountable rims and 37x5 inch tires front and rear. Wire wheels special.

Gasoline Tank—22 gallon capacity on upper part of dash over toe board giving gravity feed direct to carburetor.

Drive—Left hand drive with center control.

Equipment—Electric starting and lighting, with dash lamp and two-tone electric horn, patent one-man pantasote top with drop side curtains, special windshield with ventilator, dust cover, speedometer and clock, combination tire holder and trunk rack, two extra demountable rims, coat and foot rails, cocoa matting in tonneau and complete tool and tire outfit.

Prices—Five Passenger Touring Car, \$2900. Seven Passenger Touring Car, \$2980. Sedan Type, \$3900. Berline Type, \$4300; f. o. b. factory Indianapolis, Indiana.

Why No Other Car Can Be Compared to the Lyons-Knight

First—bear in mind this Lyons-Knight is a car of distinctive features—with Knight engine, worm drive and many other new and individual points.

Made in a great factory covering sixty-five acres with its own foundries, machine shops, drop forge and die cast plants, with six miles of its own railroad tracks within the factory itself.

Backed by unlimited capital to produce an unequaled car.

Guaranteed Better

We guarantee this Lyons-Knight engine, with its improved automatic force-feed oiling, new sleeve design and other features, to surpass the performance of any poppet-valve engine made of equal size—to surpass the performance of many six-cylinder poppet-valve engines of larger size.

The Lyons-Knight Worm Drive brings to this big 130 inch wheel-base car—a new and delightful freedom from the noise and grind of bevel gears. It delivers a greater per cent of power—grows better and smoother with use.

"The Car of Silence"

—really sounds a new slogan in the automobile world. A ride in the Lyons-Knight is different—as one man said—

"It spoils the enjoyment of any other car." Its silent, smooth, efficient operation brings a new delight to motoring.

The Dealer Knows

—the advantage of selling a car that is not in any other class.

The Lyons-Knight is so much lower priced than other high-class cars that there is no comparison.

It is so far in advance of any other car of its price that comparison is avoided.

It is in a class by itself. It cannot be compared to any car because it brings a new idea to the world of motoring.

That is why wise, far-seeing dealers are writing for information, coming to the factory and securing territory on the "Lyons-Knight."

There are definite reasons why you should learn all the facts quickly.

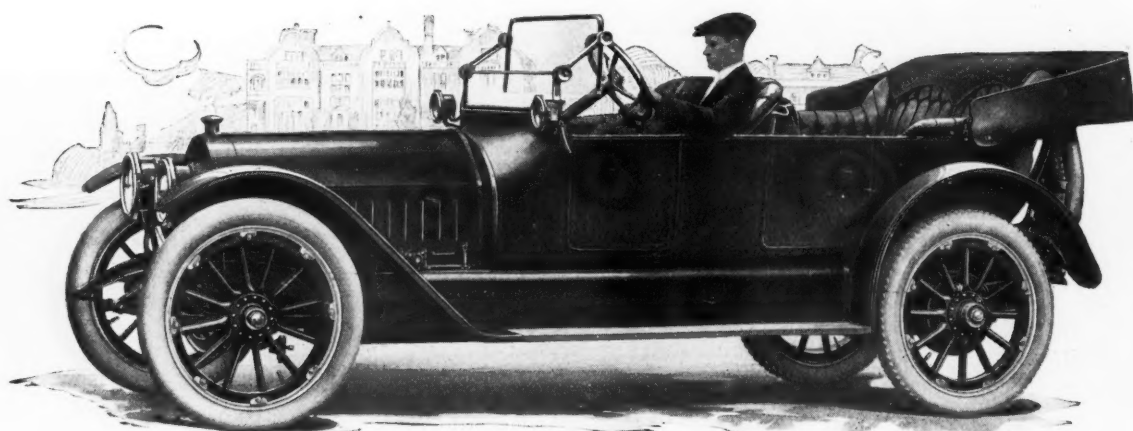
Get the Particulars

You may question these assertions. Ask us to send you the Lyons-Knight advance Catalog and the "Proofs of the Lyons-Knight."

We are willing to put the case up to a one man jury—you.

Act.

The Lyons-Atlas Company
Indianapolis **Indiana**



A "Six" that is Different

The new KisselKar 48-"Six" was designed to serve a definite purpose, to fill a distinct and different niche. It is in a class all its own. Neither a "big six" or a "little six," it fills in the gap between, making the ideal compromise for the man who considers a "big six" too big and the average sized "six" inadequate.

48 "Six" KISSELKAR 48 "Six"

The KisselKar 48-"Six" is one of the very few really upper-class cars selling at a moderate price. It is growing steadily in favor of those who know Automobile values and buy only after careful comparison.

The lines of the KisselKar 48-"Six" are unsurpassed in beauty. The low hung body, running boards free from boxes or brackets, 21-inch doors and new, rounding top fenders will impress you with the artistic symmetry of the design. The KisselKar Motor is remarkable for simplicity, power, silence and ease of control.

KisselKar 48-"Six" riding comfort is unique. It is due to the liberal wheelbase—big wheels—big tires—springs specially constructed ac-

cording to weight—unusually roomy tonneau—deep seat upholstery—the perfect "balance" of the car, and almost entire absence of engine vibration.

There are three KisselKar Models: 48-"Six," \$2350; 60-"Six," \$3150, and 40-"Four," \$1850—all completely equipped, electric started and lighted; left-hand drive, centre control.

Demonstrations of all models are at your service at any of our hundreds of branches and agencies. Look up the KisselKar Dealer in your locality, or write us for illustrated catalog.

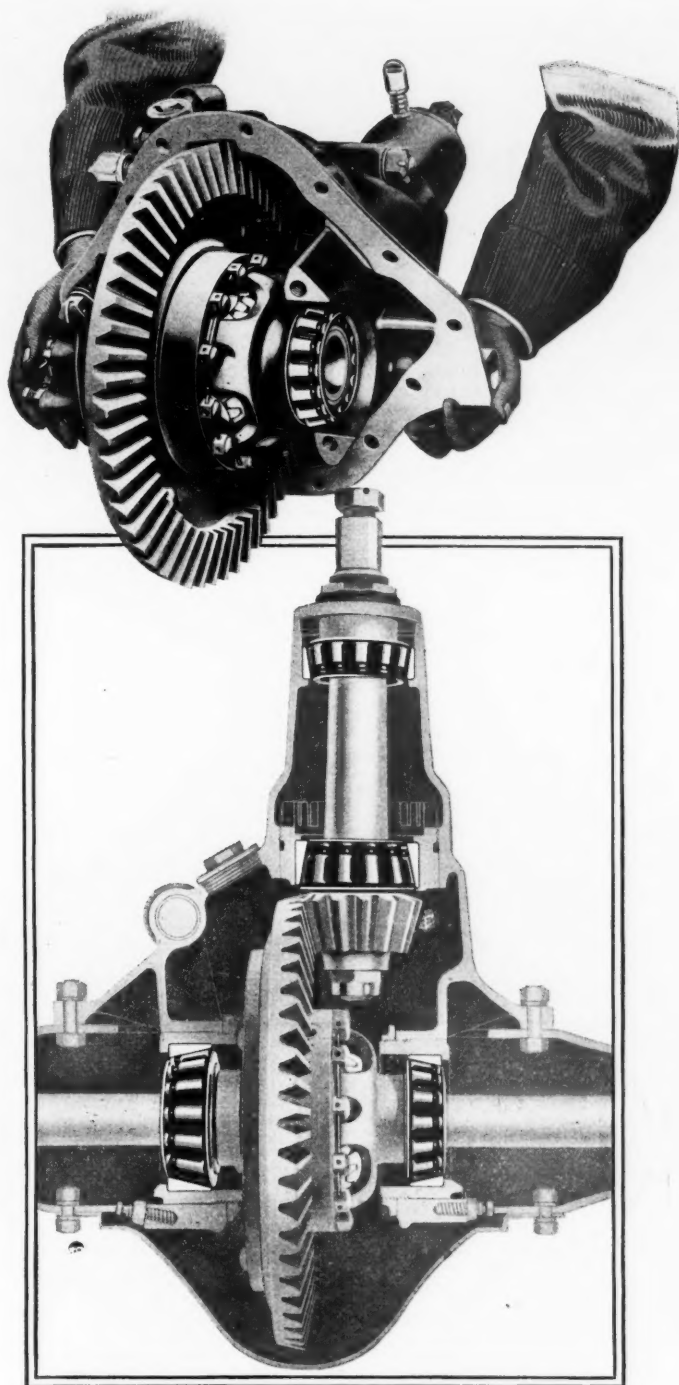
KISSELKAR SERVICE CONTRACT

The KisselKar is sold under a written guarantee of service to owners—a tangible, definite and specific contract that clearly stipulates the scope of KisselKar Service and provides for care that forestalls trouble and retards depreciation.

KISSELKAR TRUCKS—SIX SIZES—1500 LBS. TO 6 TONS. WRITE FOR CATALOG

KISSEL MOTOR CAR CO., 121 Kissel Ave., Hartford, Wis.

BOSTON, NEW YORK, CHICAGO, MILWAUKEE, KANSAS CITY, MINNEAPOLIS, ST. PAUL, DALLAS, SAN FRANCISCO, LOS ANGELES, OAKLAND, Philadelphia, Detroit, Houston, El Paso, Washington, Baltimore, Nashville, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Rochester, Providence, Cincinnati, Newark, Montreal, Quebec, Toronto, Winnipeg, Calgary and 300 other principal points throughout America.



Unit Power Transmitting Plant of a Timken-Detroit Rear Axle

TIMKEN-DETROIT
AXLES

The Teeth that Always Fit

Part II

A Sequel to
the Gear with the
Polished Teeth

THESE gears with polished teeth are made to fit. ¶ The angles and curves of their shining surfaces are exact. ¶ They are fixed by the Timken process of grinding every gear to its master pinion, every pinion to its master gear.

But that accuracy of gear-grinding is not enough. We must know that the teeth will fit *after the gears are installed, as long as they are in the car*—or uneven wear, noise, and loss of power would result.

How We Know the Teeth Will Fit

All the gears are supported by a pear-shaped carrier bolted to the front of the axle-housing.

The pinion shaft enters from the front, the driving gear and differential are supported by two curved arms extending into the housing at the rear.

It is because we know that carrier is made right that we know the teeth of the gears will always fit.

Four Big Problems

The front of the carrier must be in a plane exactly at right angles to the plane of the drive-gear; the axle shafts must also be exactly at right angles to the plane of the drive gear; and at exactly the right distance from the pinion; the pinion-shaft must be exactly parallel to the plane of the drive-gear.

These four problems are each double—each step must be done right, each must be proved right after it is done.

The doing and the proving are two mighty interesting chapters in the story of "The Teeth that Always Fit."

In the next issue of this magazine you will find Part Three of this series, on "The Four Holes."

NOTE:—To get the full significance of this series you should read Part I—"The Gear with the Polished Teeth," which appeared in the previous issue. If you haven't a copy we shall be glad to mail you one.



The Timken-Detroit Axle Co.
 Detroit, Michigan



5-X-Test Tubes

The Dealer's Best Advertisement

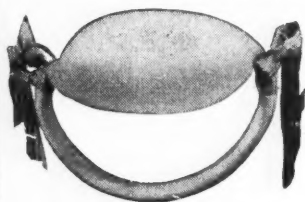
JUST ponder for one minute, Mr. Dealer, what business building power you have in a Tube like 5 X-Test.

You can sell this tube and KNOW that it will give your customer 100 per cent service. We build that service into it. We use very fine rubber. And each tube is made very carefully by experts.

Every 5-X-Test Tube you sell is a business building advertisement for your store. That Tube will not only sell scores of others among users' friends, but it will bring you business in other lines.

Every live, conscientious dealer wants to give the best tube possible for the money. We want you to test this tube. The quality will convince you—our special exclusive proposition will interest you.

Read how we build the Mansfield quality into it and then write us for a sample section.



Made of Fine, Pure Rubber

Fine pure gum—unadulterated—is used in building 5-X-Test Tubes. We prepare the rubber by a special formula to increase the life, and toughness to the maximum. Therein lies the secret of 5-X-Test superiority.

Careful Building

We build each 5-X-Test Tube very carefully—and

very slowly. The work is done under the supervision of the most exacting inspectors. Through this very careful building we secure absolute tube-perfection.

The Test of Strength

The great strength of this tube is proved by the picture. It's from a stock tube inflated to more than 5 times normal size.

Prove Our Claims

Write us right now for a sample section, and let us prove our claims for 5-X-Test Tubes. We want you to compare 5-X-Test with the tube you now sell. Our exclusive dealers' proposition is very liberal and will interest you. Write us now.

Mansfield
CABLE STRUCTUR

Control the Sale of the Cable-Structur Tire

Our sales policy confines the sale of Cable-Structur Tires to one man in a town. You will quickly appreciate what that means to you.

We still have some territory open. Write us today and control the sale of this great tire in your city. Just say "give us your exclusive dealer's proposition as outlined in Motor Age, and send your catalog." (112)

The Mansfield Tire & Rubber Company
Mansfield, Ohio



The Foreign Trend

The builders of motor cars abroad are constantly introducing new ideas, new body designs, new equipment, and new methods of construction.

There are wire wheels and worm drive now. And other things are promised.

But some things there, as here, are standard.

One is The Jones Speedometer.

Seven years ago The Jones became Europe's most popular speedometer.

It won the Royal Automobile Club's gold medal for all around superiority in a test that covered 2,000 miles and lasted 30 days.

It was placed on the cars of the King of England, the Emperor of Germany, the Czar of Russia, the King of Italy, the King of Spain, and the Kings of Siam, Norway, Sweden, Denmark and Belgium. The President of Switzerland and the President of France, and hundreds of other notables used it. It is used by these rulers and thousands of others on the best cars today.

No other speedometer ever gained such prestige or was ever so widely sold abroad.

No other sells there today like the Jones. The love of new things—the foreign trend—doesn't dislodge the Jones.

It is regarded as the Standard Instrument because of its accuracy. And nobody ever thinks of displacing it.

The makers of thousands of American cars are factory-equipping their product this year with the New Jones Speedometer.

They expect their cars to be used the year 'round and they know the Jones isn't affected by temperature.

The Jones is the Universal Speedometer. Makers and owners are finding this out. It is accurate, *always*. The simplest in principle. And the longest lived.

It's the product of Jos. W. Jones, the inventor of the speedometer as used on motor cars. Nothing else will ever serve like the Jones Speedometer.

Let us send you the man who knows it in detail and can give you the fullest information in regard to placing it on your car.



This is the gold medal presented to The Jones Speedometer by the Royal Automobile Club of Great Britain and Ireland. Eleven different instruments competed in the test—foreign and American makes. The Jones made the only perfect score on seven points of superiority.

And the Jones is the only speedometer that has ever won this medal.

THE JONES SPEEDOMETER

Broadway at 76th Street NEW YORK CITY

Branches New York, Broadway at 76th St.; Boston, 109 Massachusetts Av.; Philadelphia, 1427 Vine St.; Chicago, 1430 Michigan Av.; Baltimore, 217 W. Saratoga St.; Detroit, 872 Woodward Av.; Buffalo, 20 Goodrich St.; Pittsburgh, 5904 Penn. Av.; Cleveland, 1845 Euclid Av.; Charlotte, 209 Church St.; Memphis, Madison Av. and Fourth St.; Minneapolis, 800 Hennepin Av.; Omaha, 1008 Harney St.; San Francisco, 1436 Van Ness Av.; Los Angeles, 408 W. Pico St.; Portland, Ore., 71 Seventh St.; Seattle, 1710 Broadway; Indianapolis, 1201 State Life Bldg.; Atlanta, 35 N. Pryor St.; New Orleans, Baronne and Perdido Sts.; Birmingham, 18 S. 20th St.; Denver, 1600 Broadway; Newark, N. J., 283 Halsey St.; Albany, N. Y., 133 Hudson Av.

Foreign Agencies J. Millen & Son, Ltd., Montreal, Toronto, Winnipeg, Vancouver; Markt & Co. (London), Ltd., London; Markt & Co., Hamburg, Milan, Vienna, Barcelona; A. A. Kampfraath (Brussels), Ltd., Brussels, Amsterdam; Severin & Co., St. Petersburg; G. Bruggemann, Moscow; Y. D. Rose, Paris; William D. Easy & Co., Sydney, Australia; The Tarrant Motor Co., Melbourne, Australia; C. E. Helvie, Manila, P. I.; Adams, Ltd., Christchurch, New Zealand; Markt & Schaefer, Co., Rio de Janeiro, Brazil; Buenos Aires, Argentine; Mexico City, Mex.; Habana, Cuba; San Juan, P. R.

Overland

1914

\$950

Completely equipped f. o. b. Toledo

With Gray & Davis electric starter and generator—\$1075

IN seven days after the announcement of the 1914 Overland, we had immediate shipping orders for 5,000 cars.

This was one-tenth of our 1914 output—50,000 cars.

With a price *lower* than ever and a value *greater* than ever the 1914 Overland is already established as the most sought after car of its type in the entire world.

Read the specifications.

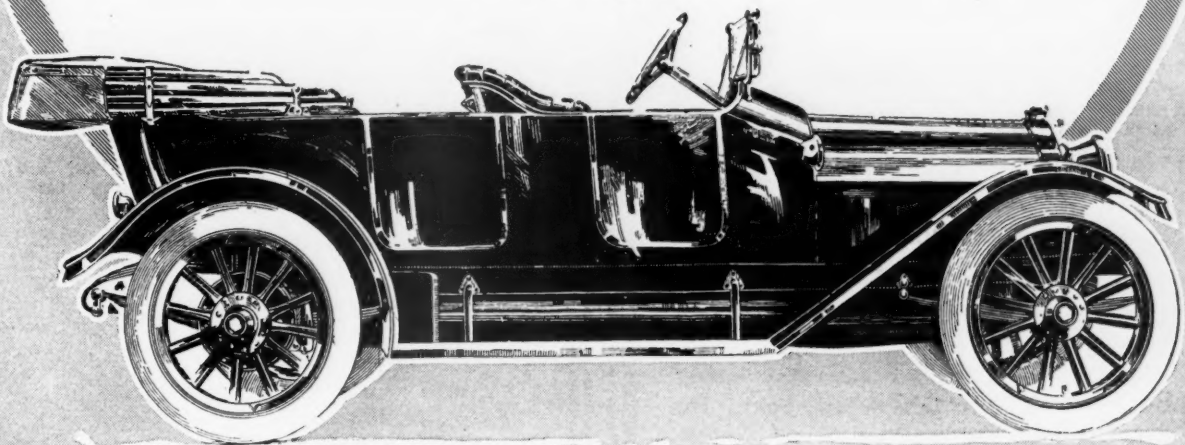
35 horsepower
114-inch wheelbase
Electric head, side, dash
and tail lights

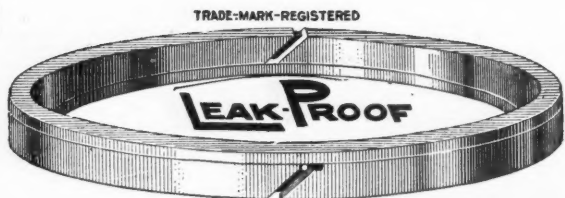
Timken bearings
33x4 inch Q. D. tires
Cowl dash
Clear-vision windshield

Mohair top, curtains
and boot
Stewart speedometer
Electric horn

1914 Catalogue on request
Please address Dept. 46

The Willys-Overland Company
Toledo, Ohio





Softer than the Cylinder— Lasting as the Motor

*It is cheaper to replace
piston rings than cylinders*

A piston ring has to be of a softer iron than the cylinder is made of—else your cylinder wears and you've got an imperfect cylinder, assured leakage and increased carbonization until it is re-bored or re-ground.

Yet—a piston ring must have body to give it the spring and **last-
ing** elasticity which are necessary for equal tension and to retain the roundness and perfectness of the cylinders—else you've got leakage, (decreased power).

LEAK-PROOF Piston Rings

(PATENTED)

are made of Processed Gray Iron—a special processed iron having **just** the properties of softness and spring that make the ideal piston ring. Too soft to wear out the cylinder, yet hard and strong enough to last as long as the motor will last.

**Now in Use on Over 150,000
Automobiles**

"Ask the User"

A booklet on request—complete information as to how Leak-Proof Piston Rings can be applied to your piston problems if you'll write us.

Manufactured by

McQuay-Norris Mfg. Co., Dept. 11 St. Louis, Mo.

Branch Offices

New York—53 Lincoln Square Ct., Broadway at 64th St.
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Pittsburg—7620 Tioga Street. Kansas City—1504 Grand
San Francisco—164 Hansford Avenue.
Building. Los Angeles—224 Central
Ft. Worth—108 Bryan Street. Building.

Have You An Unsatisfactory Magneto?

Even if your motor has no timer
shaft you can nevertheless install

The Atwater Kent Ignition System

by means of our "Magneto Gear Mounting." It fits the standard magneto platform and connects to the magneto drive shaft. The gears it contains are enclosed, smooth running and quiet in operation.

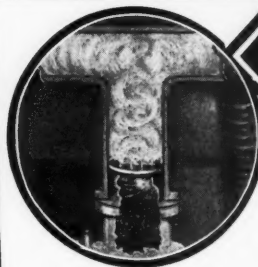


For one-half the price of a new magneto you can replace your old one with an Atwater Kent System which will run your motor as smoothly "on high" at three miles an hour as at thirty or fifty. If you are also interested in increasing the speed, flexibility and hill-climbing ability of your car, you will want a copy of our latest literature describing the Atwater Kent System.

WRITE
FOR
FOLDER "A"

ATWATER KENT MFG. WORKS

4934 Stenton Ave.
PHILADELPHIA



AUTO DEVICES

Lead the World for
Efficiency and Economy
At Dealers Everywhere

MONDEX-HELIX GAS SAVER

*Reduces Your Gasoline
Bills 25 to 40 Per Cent*

MONDEX POLISH For Auto Bodies and all varnished surfaces. Dries instantly, leaving a brilliant lustre. Send for Free Sample.

MONDEX SHOCK PREVENTERS

Reduce Your Repair Bills 100 Per Cent

Saves wear and tear of tires
and eliminates all vibration

Motor Car Racing Says: "Mondex Shock Preventers proved they are right in the highest court of mechanical test known."

Write for Booklet "N"

Agents Wanted Everywhere

RELiance AUTOMOBILE CO.,

Agents for
Pacific Coast, San Francisco, Cal.

THE ARISTOS CO.
250 W. 54th Street, N. Y.



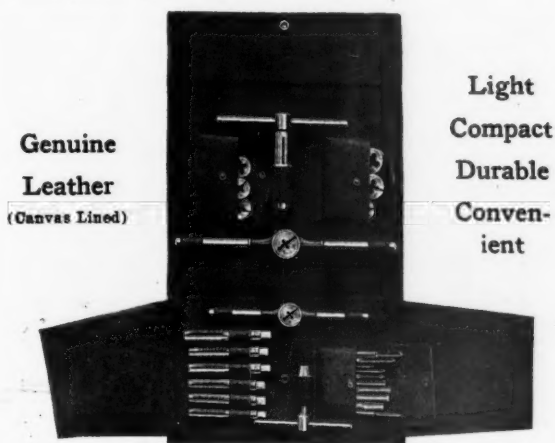


"A Stripped Thread and 15 Miles to a Garage"

Prepare for such an emergency by always carrying with you a set of Wiley & Russell Screw Cutting Tools.



You can cut a screw thread in a few minutes and possibly save yourself being towed in. Especially adapted to Ford Cars. Forty years' manufacturing experience is built into this kit. No garage is complete without it.



Genuine
Leather
(Canvas Lined)

Light
Compact
Durable
Convenient

Has 16 Taps, 16 Dies, 2 Stocks and 2 Tap Wrenches

MANUFACTURED BY
WILEY & RUSSELL MFG. CO.
GREENFIELD, MASS.

New York
90 Center St.

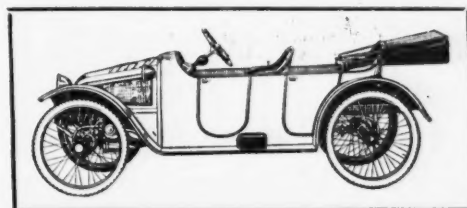
Philadelphia
38 N. Sixth St.

Chicago
545 W. Washington Blvd.

SEE ONE AT YOUR DEALER'S

America's First Cyclecar

Friction drive. Tandem seats. Rear seat detachable for parcel box. Motor, 4-cylinder, 14 H. P. Body and fenders pressed steel. 30 in. Tread. 35 in. over all. Wheel base, 7 ft. 2 in. Non-skid. Self-starter. Side doors. Will pass through any ordinary door, into hall, basement or store. No garage expense. Weight, about 450 lbs. Variable speed from 2 to 50 miles per hour. Cost of operating less than one cent per mile.



Anyone who can afford street car fares can afford a WOOD'S MOBILETTE

It will carry two at about
the price of one car fare

Simple—Silent—Speedy—Safe and
Reliable. Anyone can drive it—man,
woman, child, cripple or invalid.

Price, between \$350 and \$450,
depending upon embellishments.

Write for further particulars. Reliable
agents wanted. Exclusive territory.

Chicago Salesrooms: 1509 So. Michigan Blvd.
Executive Office: 1001 Security Bldg., Chicago

"Soot-Proof" Spark Plugs Never Balk— Over 2,000,000 Prove It



Not all spark plugs will carbonize.
Not all get dirty, grow weak or short circuit.
And not all spark plugs call for frequent replacement.
Mr. C. A. Mezger—after twelve years spent on spark plug problems—has perfected and patented the "Soot-Proof" plug.
This plug is warranted to clean itself. It never clogs, never leaks, never short-circuits. And it lasts for years.
Its use forever ends all spark plug worries.
It is built with a double chamber. Thus it offers at least three times the resistance of any other spark plug made.
It outlasts any other by two or three times over.
This has all been proved to hundreds of thousands. For over two million "Soot-Proof" plugs are now in use on the leading cars of America.
One "Soot-Proof" plug will prove this to you. If you have any doubt, use old-type plugs with it. Note the difference in results.
Do this now. Think what it means to have spark plug troubles forever wiped out. This spark plug will do it—that is guaranteed.
Get them from your dealer. If he can't supply, find a dealer who can. Or send to us direct. In replacements alone these "Soot-Proof" plugs will save many times what they cost you.

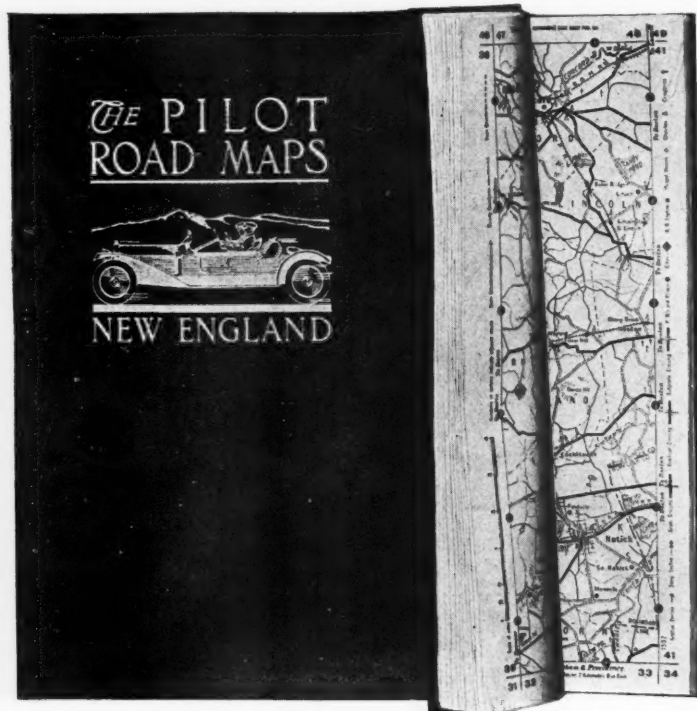
C. A. Mezger "Soot-Proof" Spark Plugs

C. A. MEZGER, Inc., 15 Canal Place, New York

Philadelphia, 1427 Vine St., Petry-Cassidy, Inc.
Chicago, 1430 Michigan Boulevard, F. E. Sparks
Detroit, Ford Building, H. E. Butcher

Portland, 329 Ankeny St., Hughson & Merton
Seattle, 924 E. Pike St., Hughson & Merton
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San Francisco, 530 Golden Gate Ave., Hughson & Merton

The Pilot Road Maps of New England



(2/3 Actual Size)

A completely revised edition of the popular Pilot Road Maps that will appeal to the motorist from the standpoint of convenience and accurate road information.

Detail and City maps.

\$5.00 the Volume

On sale at good book stores, automobile supply houses, hotel news stands, Blue Book Touring Bureaus. Or sent prepaid upon receipt of price.

**The Automobile Blue Book
Publishing Company**

910 So. Michigan Ave.
Chicago, Ill.

2160 Broadway
New York

When Writing to Advertisers, Please Mention Motor Age.

After thoroughly trying them out, practically all the leading automobile engineers have proven Gabriel Rebound Snubbers to be without an equal for reducing upkeep expense and increasing riding comfort. Hence Gabriels are being used in increasing quantities on practically all the foremost cars.

Gabriel Snubbers Will Outnumber All Others on 1914 Autos. Standard Factory Equipment on the 7 Easiest Riding and Leading Cars

Gabriel Rebound Snubbers are the one device perfectly meeting the needs of modern flexible springs. They retard only the up-stroke, allowing full flexibility of springs on the down-stroke, so necessary to easy-riding comfort on smoother roads.

Mr. Dealer:

Gabriel Rebound Snubbers add selling value, a finishing touch, to your cars that no other device can hope to give them. Ask your factory what they think of Gabriel Rebound Snubbers.

LIVE AGENTS WANTED

Gabriel Horn Mfg. Co., —1415 East 40th Street—**CLEVELAND, OHIO**

Makers of the famous GABRIEL Musical Horns and auto accessories

GABRIEL Rebound Snubbers



Easy to put on. No drilling or otherwise marring the car. Noiseless at all times. No further adjustment required and will outlast the car.

AS GOOD AS CHEAPER GASOLINE



WE cannot supply you with cheaper gasoline, but we can make each gallon do more work.

By using Cook's Lubricant, friction will be at the irreducible minimum, and a large percentage of the horse-power developed by the engine will be available for driving your car instead of being wasted in friction. Furthermore, wear and tear will be decreased and the joy of a noiselessly operating car will be yours.

Ask for literature describing the unique features of Cook's Lubricant. Also be sure to use Albany Grease in all your grease cups, and remember that the same care that has made Albany Grease famous for 45 years is used in compounding Cook's Lubricant

ADDRESS—COOK'S LUBRICANT DEPT.

Albany Lubricating Company

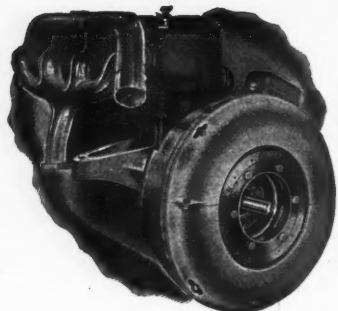
ADAM COOK'S SONS, Prop.

708-710 Washington St.,

(107)

New York

U-S-L



U-S-L

Takes the place of the Fly-wheel

The U-S-L Electric Starter and Lighter is a combination motor and generator that takes the place of the fly-wheel. The armature of the motor-generator is bolted directly to the engine crank-shaft.

The U-S-L doesn't add a single extra moving part to a car.

No gears or chains	No extra clutches
No added weight	Starts at a push of foot-button
No bearings to oil	Supplies ample current

Adopted by
 Rambler, Overland, Garford,
 Edwards-Knight, Moyer, S. G. V.

Write for Bulletin 501

The U. S. Light & Heating Co.

General Offices: 30 Church St., New York

Branch Offices and Service Stations—New York, Boston, Buffalo, Cleveland, Detroit, Chicago, St. Louis, San Francisco.



Now—weigh the car—not its price. The light and powerful Ford competes for your favor with every other car—no matter what the price. That its cost is small is due to the manner and magnitude of its making.

Five hundred dollars is the new price of the Ford runabout; the touring car is five fifty; the town car seven fifty—all f. o. b. Detroit, complete with equipment. Get catalog and particulars from Ford Motor Co., Detroit.

Starts — Lights — Ignites

REMY

Six Volt System—Does-It-All

WHEN you specify "Remy" as the electrical equipment of your product you eliminate all risk of car depreciation next season.

And the Remy is the only factory in America furnishing the entire electrical equipment for your product—Starting, Lighting and Ignition apparatus in whole or in any combination. Responsibility for the efficient electrical operation of your product is borne by one factory.

Remy Starting and Lighting Equipment is adapted to individual car needs and is sold only to manufacturers. Individual owners of Remy apparatus have the benefit of a National system of service stations.

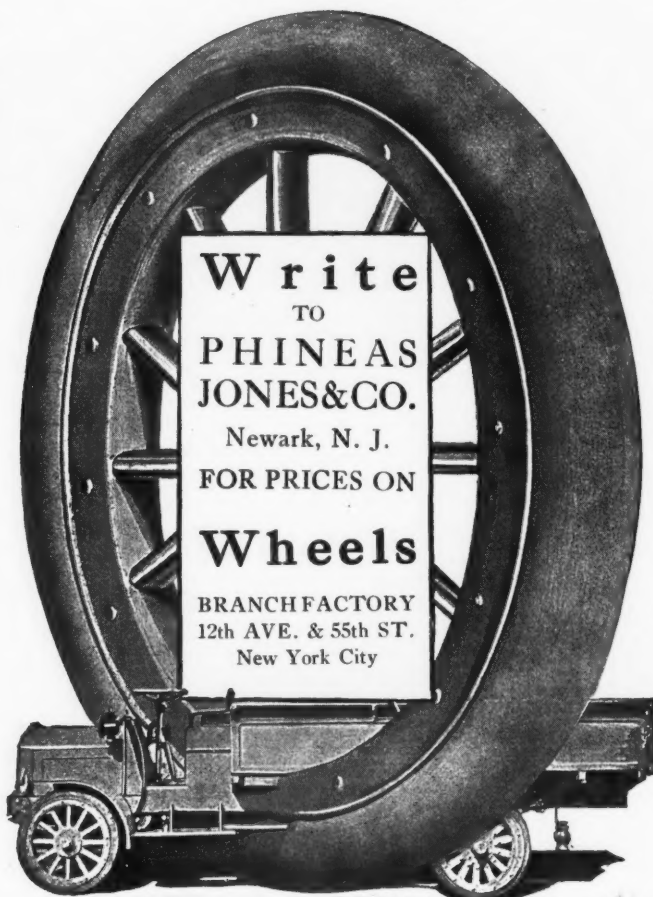
Write us about our liberal magneto (any make) exchange offer

Remy Electric Company

General Offices and Works, Anderson, Indiana

BRANCHES:
 New York Detroit Kansas City Minneapolis
 Boston Chicago San Francisco

(Service stations throughout the country)



W r i t e
 TO

PHINEAS JONES & CO.

Newark, N. J.

FOR PRICES ON

Wheels

BRANCH FACTORY
 12th AVE. & 55th ST.
 New York City

**Rim Cutting
Entirely
Done
Away
With**

Bored
From
Solid Brass



Use
POLO

**Pneumatic
TIRE ALARMS**

Heavily Nickeled

Thoroughly Tested and Guaranteed

Easily and quickly attached to valve stem, they take the place of the cap. Compactly made and reduced to the smallest possible size compatible with strength and durability.

Prevents Rim Cutting Lessens Blow-Outs and Blisters

Running on low air pressure shortens the life of a tire more than any other cause. The Polo Pneumatic Alarm advises you instantly when the pressure falls below a given point, by giving vent to a shrill whistle.

Sold in sets of four, at \$8.00 per set.

We invite inquiries from dealers and auto users.

Write for descriptive folder

POLO PNEUMATIC ALARM MFG. CO.
Clear Lake, So. Dak.

Dept. of Chemistry—State Normal School,
Westfield, Mass., May 31, 1913.
Gentlemen: This letter is entirely unsolicited,
and we write it because we think it is due you
to tell you how highly we regard the McCormick
Power Plugs which we fitted for our Kirt car.
We get almost fifty per cent more power, and a
greatly decreased gasoline consumption. We
would not be without these plugs under any cir-
cumstances. We thank you for your interest,
and your ability to produce an article of such
merit. Yours very truly,
L. B. ALLEN,
[Pure Food Editorial] Editor "Collier's".

MCCORMICK POWER PLUG

Full Firing Efficiency

The McCormick Power Plug takes the place of the spark plug. It develops and maintains maximum firing efficiency. This must produce more engine efficiency—decreased fuel consumption and increased power—other conditions being normal. Don't you want to eliminate the spark plug troubles which are now one of the big bugbears of your motoring days? You can do it with a McCormick Power Plug. It's the most efficient electrical firing device on the market. Send us the make and model of your car and we'll send a set on a 20 days' trial. If you're not satisfied we'll return your money.

SHIPPED PREPAID

Price \$2 PER POWER
PLUG

MCCORMICK MFG. CO., 440 E. First St., Dayton, O.
Exclusive territory to agents who will meet our requirements

"Near Enough"—

won't do, if you want to know the *exact cost* of upkeep of pleasure or commercial vehicle. Mileage must be correct to a fraction if you are interested in tire, gasoline or "juice" and lubricating consumption. Exact mileage is only obtainable with a VEEDER HUB ODOMETER—which *can't be tampered with.*

Neat, durable and compact, it can be easy attached. Price complete, **\$25.00**

At your dealer's direct from our factory or at the following agencies:

T. H. Cranston & Co., 56 E. Randolph Street, Chicago, Ill.

Bernard I. Bill, 543 Golden Gate Avenue, San Francisco, Cal.

The Veeder Manufacturing Company
C. H. VEEDER, President D. J. POST, Treasurer
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HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachometers, Counters and Small Die Castings

MAYO SPARK PLUG PUMP

\$10

Substitute for any spark-plug. The motor does the work, fills the largest tire with pure, fresh air in from 2 to 3 minutes. Built with metal rings like a motor and will last as long. Adaptable to all size cars from the smallest Ford to the largest Lozier. Weight, 2½ lbs. Complete with 12 ft. of hose and connections. Price, \$10.00. With pressure gauge, \$2.00 extra.

Mayo Mfg. Co.
55 East 18th Street
CHICAGO, ILL.

Try It
FREE
on
Your
Car
For
30
Days
Write
Us

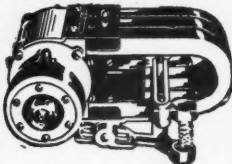
Improve the appearance and efficiency of your car by installing the

K-W Electric Headlight Outfit, \$40

Complete Outfit: Generator, Head Lamps, Switch, Wire and Bulbs

Easy to install on any car having exposed flywheel or other place to drive the Generator.

Light Weight Generator weighs but 18 lbs. Compare it to the heavy complicated and costly charging outfits. If you have the Electric Head Lamps, get the K-W Electric Generator only \$25.



Can be used for Ignition in connection with Timer and Spark Coll.

**Handsome
made-for-the-purpose
head lamps**



No extra charge for black finish. The reflectors are set in the door against a felt ring to keep out dust and moisture. They are made of correctly formed brass heavily silvered and highly polished on the reflecting surface. Lamps alone, \$15 and \$17.

K-W Ford Electric Headlight Outfit, \$15

FOR FORD CARS WITH FLYWHEEL MAGNETO

The successor to the gas tank. The most successful electric headlight outfit for Ford cars, because it is especially designed and engineered to work in connection with the Ford Flywheel Magneto.

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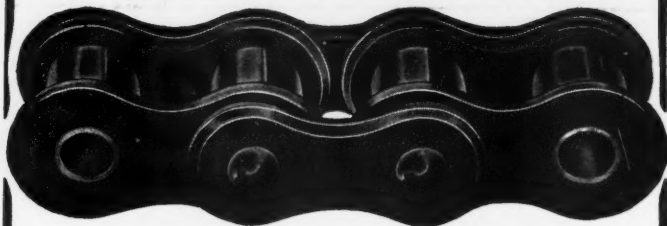


2835 Chester Avenue

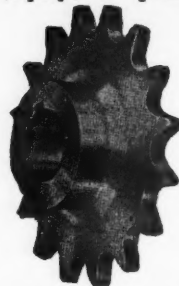
We also make the famous K-W Master Vibrator
The Standard by Which All Others Are Judged

CLEVELAND, OHIO, U.S.A.

BALDWIN Chains and Sprockets



run well together; made in a completely equipped plant with an organization



skilled in the art by long experience. Manufacturers should have samples and prices of our chains, and allow us to quote on their blue prints for sprockets before placing their 1913 orders. We

are prepared to furnish sprockets for replacements for all standard and commercial cars.

H. V. GREENWOOD, 122 So. Michigan Blvd., Chicago, Ill. C. J. IVEN, Rochester, N. Y. M. A. BRYTE, 788 Mission St., San Francisco, Cal. C. D. SCHMIDT, 416 Broadway, New York City. F. SHIRLEY BOYD, 893 Boylston Street, Boston, Mass. AUTO EQUIPMENT CO., Denver, Colo.

The WARNER TRANSMISSION

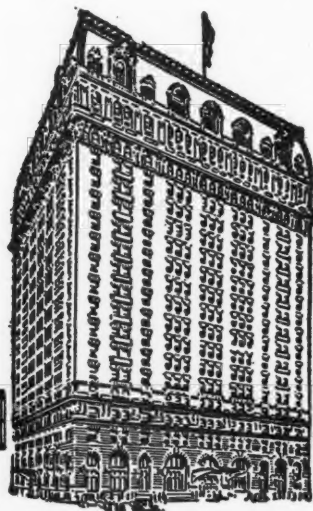
MADE
IN

MUNCIE IND.

BY
THE

WARNER GEAR CO.

DETROIT-OFFICE
626 FORD BLDG.



Hotel La Salle

CHICAGO'S FINEST HOTEL

ERNEST J. STEVENS, Vice-Pres. and Mgr.

Located in the heart of the city, within easy reach of all railway terminals

RATES

ONE PERSON	Room with detached bath.....	\$2 to \$3 per day
	Room with private bath.....	\$3 to \$5 per day
TWO PERSONS	Room with detached bath.....	\$3 to \$5 per day
	Room with private bath.....	\$5 to \$8 per day
TWO CONNECTING ROOMS WITH BATH		
Two persons		\$5 to \$8 per day
Four persons		\$8 to \$15 per day
SUITES		\$10 to \$35 per day

LA SALLE AT MADISON STREET, CHICAGO

WHEN YOU BUY
AN
AUTO
TRUNK



Look for
the Red
" and Gold "Diamond
on the Front

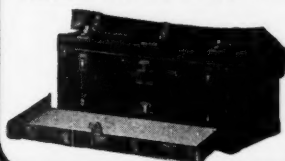
The red and gold trade-mark shows that it's a genuine Kamlee—the handsomest, strongest, most convenient auto trunk ever made.

Light and flexible, yet tough and durable in the extreme, it fulfills every requirement of the touring motorist. New air-tight interlocking edge makes

THE NEW KAMLEE

*The Only Really Dust-Proof
and Rain-Proof Auto Trunk*

on the market. The edges lock together—rain or dust cannot enter anywhere. A rubber tubing at bottom of interlocking groove conforms to any irregularity or give in top and front. Contents thoroughly protected in any weather. Waterproof covering is fastened over top with patent spring-swivel nuts. No straps to bother with in opening. See it at your dealer's or write us for prices and descriptive booklet. We'll gladly send you a Kamlee on approval anywhere if your dealer can't supply you.



THE KAMLEE COMPANY
234 Broadway Milwaukee, Wis.

5 Pounds



Trade Mark
Registered

50 Pounds

Which for You?

Many a car is not equipped with a towline, as all cars should be, because the owner doesn't want to cumber it up with heavy, bulky Manila rope. Basline Autowline is light, neat, compact and

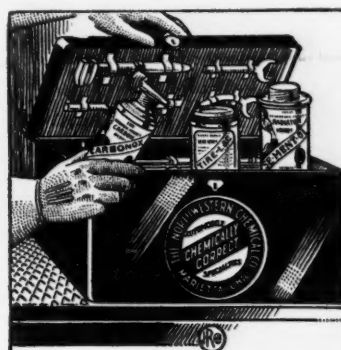
Coils Up Flat Under a Cushion

It is 25 feet of famous Yellow Strand wire rope. Pulls a 4,000-lb. car up a 20% grade. Starts a stalled car on its own power. \$3.75 at your supply dealer's. Buy one today and be equipped for every emergency of the road.

DETAILS FREE Send now for fully illustrated Autowline circular

The Little Steel Rope with the Big Pull

BRODERICK & BASCOM ROPE COMPANY, 813 North Second Street
ST. LOUIS, MISSOURI
New York Office, 76 E. Warren Street
Manufacturers of world-famous Yellow Strand Wire Rope



THE MODERN TOOL BOX

Quick acting,
highly efficient
tools are these:

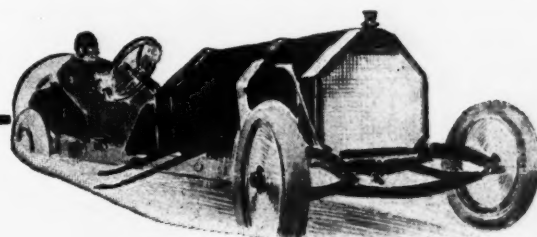
SE-MENT-OL, the self-acting radiator cement.

TIRE-LAC, the Chemically Correct tire paint.

CARBONOX, the most simple and satisfactory carbon remover.

The above are only a few of the "Chemically Correct" line of auto specialties.

THE NORTHWESTERN CHEMICAL CO.
Marietta, Ohio.



Pre-eminently

the safe glove for speeding, and for emergency in ordinary going—the hard service glove for constant driving—the distinctive glove for dressy folk—the comfortable glove for every motorist and motoring occasion—

Grinnell Gloves

Sold with a Bond



Style
4927

Most motorists know the Grinnell "Rist-Fit" feature—the "V" of soft leather in the cuff, and the adjusting strap, by which the glove is made to fit snug and smooth at the wrist and the gauntlet is firmly held in place. Doubtless you know, too, the superior leather qualities of this glove. Made of specially tanned coltskin, guaranteed not to crack, peel, scuff or harden.

Now comes the "Grip-Tite" feature—corrugated double palm and inner thumb—making the easy grip a sure one, giving constant, firm control at steering wheel with minimum of effort—and which doubles the life of the glove.

Whether you motor, golf, hunt, fish require street gloves or gloves for heavy work, you will find there is a Grinnell Glove made especially for your purpose, and made with extreme care in every detail. Ask your dealer—or

Write us for Free Glove Book showing Grinnell Gloves for motoring and other outdoor uses—also for samples of leather and our "Pair on Approval—Prepaid" offer.

Morrison-Ricker Mfg. Co. 64 Broad St.
Grinnell, Iowa
Established 1856

You want what you want when you want it
If It's

Packard

CABLE

we can ship promptly 10 feet or 10,000 feet. Over 80% of our shipments are made within 24 hours after receipt of order.

The Packard Electric Co.

Dept. C.

Warren, O. 168

Cut Gears of Quality Complete Differentials



**NEW PROCESS
GEAR CORPORATION**

SYRACUSE, N.Y.



The *Pilot* "THE CAR
AHEAD"

Three Great Models: Pilot 40—Four cylinders, 4½x5; brake test, 53 horse-power; 120" wheel base; price, \$2000. Pilot 50—Four cylinders, 4½x6; brake test, 59 horse-power; 126" wheel base; price, \$2250. Pilot 60—Six cylinder, 4x6; brake test, 67 horse-power; 132" wheel base; price, \$2500.

The Car Without a Mechanical Defect

Teeter "T" head motors, full floating rear axles, Brown-Lipe differential, Warner transmission, Elsemann magneto, Stromberg carburetor, handsome jewel bodies with ventilating windshield. Completely equipped, with every convenience and comfort. Dynamic electric lighting and electric starter (Gray & Davis system), power tire pump. We have the greatest agency proposition in the United States.

Write for our beautiful art book showing cars in detail

PILOT CAR SALES COMPANY

Richmond, Indiana

Reo the Fifth

Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 35 horsepower four-cylinder car of modern refinements priced at only \$1095.

R. M. OWEN & CO., General Sales Agents
REO MOTOR CAR CO., LANSING, MICH.



**We Ship On Approval
PREPAY EXPRESS AND ALLOW
10 Days' Free Trial**

The best "Nonskid" puncture-proof device for automobiles, commercial cars and motorcycles.

Try Them At Our Expense
Be your own judge—don't take any one's word for it. "The proof of the pudding is in the eating."

Perfect Score in 4 Glidden Tours.

Twin Cities to Fargo, N. D., 1909.

Twin Cities to Helena, Mont., 1911.

New York City to Jacksonville, Fla., 1911.

Twin Cities to Winnipeg, 1912.

It only costs one cent to learn our prices and guarantee on "Bricton" Detachable Treads.

Write today for full particulars

The Bricton Mfg. Co.

1293 Main St.

BROOKINGS, S. D.

Dixon's Graphite Transmission Grease No. 677



**For Transmissions
and Differentials**

Flows with the gears and will not run off.

Write for Booklet No. 82

Made in JERSEY CITY, N. J., by the
JOSEPH DIXON CRUCIBLE CO.

"THE TUGBOAT OF LAND COMMERCE"

SOLVES THE
HEAVY TRUCKING
PROBLEM



Knox

MARTIN
TRACTOR

SEND FOR CATALOGUE

KNOX AUTO CO.,

SPRINGFIELD,
MASS.



**PRESERVES
AND
PROTECTS**

TIRE NEW

MAKES TIRES LOOK NEW
an unvulcanized, rubber compound, made with a base of pure gum—waterproofs the tires and soaks down into the inner fabric, protecting it from oil and moisture.

NATIONAL RUBBER CO., 4411 Papin St., St. Louis, Mo.



Stop That Headlight Glare

Common courtesy to your fellow motorists demands that you frost your head lights while driving in the city.

You know what it means to have the glare from an automobile head light thrown in your eyes if you are driving over the city streets or parks. Essenkay Glasfrost stops the glare.

Essenkay Glasfrost is a liquid and is simply poured on the inside of the glass.

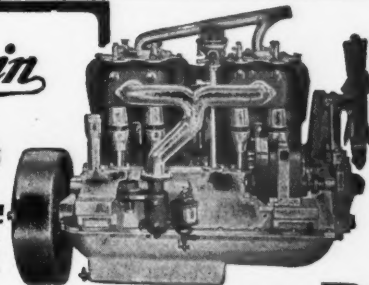
It is not affected by heat, cold or moisture and it gives the appearance of ground glass—it stops the glare and yet gives you light to see the road.

It can be taken off with alcohol when you get ready for your country trip.

If your dealer cannot supply you, send us 50c for a 2 oz. bottle (enough for eight lamps) and we will fill your order direct.

THE ESSENKAY PRODUCTS CO., 1127 W. 37th St., Chicago

Wisconsin
CONSISTENT
Motors



Real masterpieces of engineering skill. Note their special features—examine their perfect construction.

Large Bearings Large Valves
Perfect Lubrication Ample Water Jacket
Double Ignition Perfect Workmanship
Heavy Crank Shaft Long Stroke

Write us and we will tell you where a Wisconsin Motor may be seen.

WISCONSIN MOTOR MFG. CO.,

ALL 4 CYCLE—IN 5 TYPES

3 1/2 inch bore, 5	inch stroke, 4 cylinder
4 1/2 inch bore, 5	inch stroke, 4 cylinder
4 1/2 inch bore, 5	inch stroke, 6 cylinder
4 1/2 inch bore, 5 1/2	inch stroke, 4 cylinder
5 1/2 inch bore, 7	inch stroke, 4 cylinder

Dept. 25, Milwaukee, Wis.

American Axles

Found only
on high
grade cars

THE AMERICAN BALL-BEARING CO.,
Cleveland, Ohio

Safety First

Take no chances on Slippery Pavements and muddy roads.

Equip all Four tires with

Weed Anti-Skid Chains

Universally used—Increasing demand—Easily handled—No dull season—No dead stocks.

Sold by all Reputable Dealers

WEED CHAIN TIRE GRIP COMPANY, NEW YORK

The Instantaneous Trouble Finding Switch



Of course, you can find a missing cylinder by the old-fashioned method if you wish, but the up-to-date car is equipped with the INSTANTANEOUS TROUBLE FINDING SWITCHES. The old method tells you only whether or not the wire is live, while the new one tells you the condition of the spark plug as well.

A complete set of four switches, thoroughly well made, that will last practically forever, sent prepaid for \$1.25.

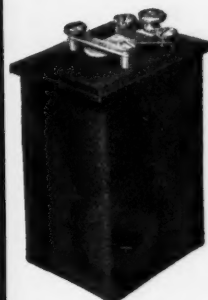
Once you own them you will never be without them. Send at once for this greatest motor convenience. (Not sold by dealers.)

Sold only by
EDGAR HERBERT
Broadway & 195th Street
NEW YORK CITY

35¢ each
SET of 4 \$1.25
PREPAID



The Most Economical Vibrator
Made Is That Used in the



Western Electric
PITTSFIELD
SPARK COILS

Send for Illustrated Booklet

WESTERN ELECTRIC COMPANY
Offices in New York and all principal cities

B. A. Gramm's Motor Trucks

Newest Designs; Latest Improvements; Built in every detail to insure satisfactory and permanent results.

Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

The Gramm-Bernstein Co.
Exclusive Motor Truck Builders
Lima, Ohio, U. S. A.

Examine A Gilbert Tire Cover

and note the care used in its manufacture. All seams even, all stitches short and tight, no loose thread ends. Every detail is carefully watched and each cover is submitted to a double inspection before leaving our factory. We guarantee absolute satisfaction and prompt deliveries.

SEND US TRIAL ORDER

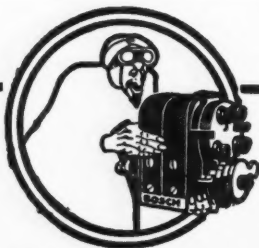
Gilbert Manufacturing Company
NEW HAVEN, CONN.
New York Branch, No. 2010 Broadway

RUDGE-WHITWORTH DETACHABLE WIRE WHEELS

Fitted With HOUK Quick Detachable Rims

Make for greater resiliency, smoother riding. Save tires. Are quickly and easily removed. Practically indestructible. Absolutely rust-proof. Now being manufactured in America by the Standard Roller Bearing Company, of Philadelphia.

GEO. W. HOUK CO.
5002 LANCASTER AVE., PHILADELPHIA, PA.



BOSCH

Also Made a Clean Sweep in Elgin Races
Bosch Magneto Co., 214 W. 46th St., N. Y.



Air Compressors

For Private and Public Garages

Single and Double Cylinders
Air and Water Cooled Types

Jacobson Machine Mfg. Co. Warren, Pa.
HASTINGS & ANDERSON CO.
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Western Representatives

KRUPP AUTOMOBILE CRANK SHAFTS, STEEL FORGINGS AND FRAME MEMBERS, GEAR BLANKS, KRUPP BAR STEEL BALL MILLS, TUBE MILLS AND OTHER MACHINERY

KRUPP RESISTANCE WIRE

USE



STEEL

GRILLED IRON ROLLERS

Call for Krupp Steel In Your Car and See That You Get It

THOMAS PROSSER & SON
28 PLATT STREET NEW YORK

KRUPP STEEL LOCOMOTIVE TIRES AND CAR WHEEL TIRES, CRANK SHAFTS, STEEL FORGINGS AND CASTINGS, STEEL TIERED CAR WHEELS, PROSSER BOILER TUBE EXPANDERS

The Practical Gas & Oil Engine Hand-Book

By **ELLIOTT BROOKES**
Author of "The Automobile Hand-Book"

THE CLASS JOURNAL CO.
910 S. Michigan Ave., Chicago


THIS work gives full and clear instructions on all points relating to the care, maintenance and repair of Stationary, Portable and Marine, Gas and Oil Engines, including How to Start, How to Stop, How to Adjust, How to Repair, How to Test. This book has been written with the intention of furnishing practical information regarding gas, gasoline and kerosene engines, for the use of owners, operators and others who may be interested in their construction, operation and management.

Pocket size 4 x 6 1/2, 200 pages. With numerous rules and formulas and diagrams, and over 50 illustrations.

Edition De Luxe

Full Leather Limp
\$1.50

A manual of useful information on the care, maintenance and repair of Gas and Oil Engines.



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HYATT ROLLER BEARING CO. Detroit, Michigan.

NEWTONE MOTOR HORNS

A Warning Signal that every motorist needs—
unequalled for efficiency in warning
and economy in operating



Torpedo Type
Price \$20

Automobile Supply
Mfg. Co.

220 Taaffe Place, Brooklyn, N. Y.

SOLAR LAMPS

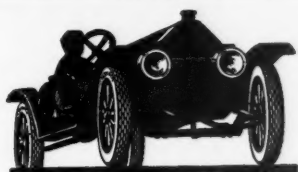
A discriminating public has voted in favor of
Solars—the quality motor lamps.

Backed by 15 years of specialization. Found
on more high-grade cars than all other makes
of lamps.

A Solar Lamp for every motor need.

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THE BADGER BRASS MFG. CO.
KENOSHA, WIS. NEW YORK CITY



If he has Republics on his car

you can rest assured he's a good "buyer."
He knows that first cost is the last item to
consider in tire buying, that quality counts
most—quality in material, in design, in
workmanship.

The Republic Rubber Co., Youngstown, O.
REPUBLIC STAGGARD TREAD TIRES

Republic Staggard Tread, Pat. Sept. 15-22, 1908

EISEMANN

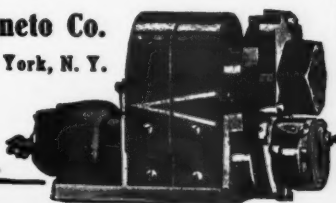
Automatic Spark Control

Quality—not only as to efficiency and manufacture,
but in design as well—characterizes all Eisemann
Ignition systems. Not only do they insure hot fat
sparks at all speeds—but they are simple, accessible
and fool proof.

The Eisemann Magneto Co.

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Indianapolis,
516 North Capitol Ave.,
Detroit,
508 Woodward Ave.



Dorris
Built to Last

THE SILENT CAR

BUILT TO LAST

Our agency proposition will
interest you. Write for it.

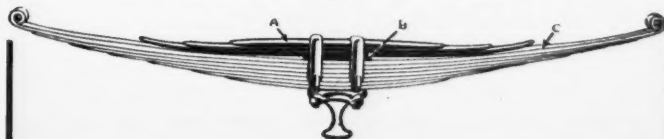
DORRIS MOTOR CAR COMPANY
100 S. Sarah Street

St. Louis, Mo.

THE AMES AUTOMATIC SHOCK ABSORBER

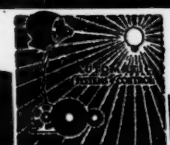
puts the pressure on recoil at the proper spot
—midway between shackle and axle.

Clarence N. Peacock & Co., Exclusive Licensees
1788 BROADWAY, NEW YORK



WARD-LEONARD SYSTEM

WARD-LEONARD



Lighting - Starting

Faultless Lighting
Infallible Starting

WARD-LEONARD ELECTRIC CO.
BRONXVILLE, N. Y.

LOZIER

"The Choice of
Men Who Know"

"SIX"

\$3250

A big, roomy, completely
equipped "Six" which will
satisfy the man who wants
the highest class, most dis-
tinguished looking motor car
obtainable.

"FOUR"

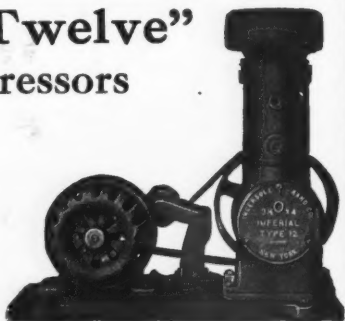
\$2100. Delivered Jan. 1, 1914
A true Lozier in every detail, 7
passengers, Gray and Davis Elec-
tric Starting and Lighting. Com-
pletely equipped. Meets the want
of the thousands of motorists
who have always longed to own
a Lozier, but who have been pre-
vented by the cost.

Lozier Motor Company, Detroit

"Imperial Twelve" Garage Compressors

A high-class car equipment deserves high-class garage equipment. The quality of these little compressors is such as to appeal to the most discriminating buyers.

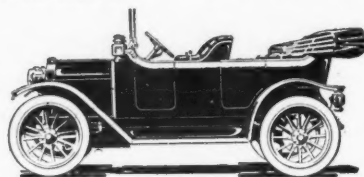
Booklet 608



Ingersoll-Rand Company
New York London

The *Detroit* — \$850 FULLY EQUIPPED

Five
Passenger
Touring
Car



25 H. P.
Long
Stroke
Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Rear Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car

BRIGGS-DETROIT COMPANY, 455 HOLBROOK AVE., DETROIT, MICH.
WRITE FOR SPECIFICATIONS



The New
Swinehart

KEATON NON-SKID TREAD
has four times the wearing service of the ordinary non-skid. Users will tell you that they have run Swinehart Keaton Non-Skid Tread Tires a whole season without having them lose their anti-skid effectiveness. Call at any one of our stores and investigate them. We also make a complete line of Smooth Pneumatic Tires of best quality. Branches and distributing agencies in all leading cities.
SWINEHART TIRE & RUBBER COMPANY
1206 North St., Akron, Ohio

SCHAFFER BALL BEARINGS

MADE IN GERMANY SOLD IN AMERICA



When you buy SCHAFFER BALL BEARINGS you are not experimenting because SCHAFFER BALL BEARINGS have for years been recognized as the standard of bearing quality. They are made in Germany of the best steel, and are now in universal use throughout the world.

BARTHEL & DALY

42 BROADWAY

NEW YORK

Elyria-Dean

TRADE MARK

Rexo Single-tone electric horn guaranteed for life—instantly responsive—eliminates constant care and adjustment.

Rexo Horn Electric Warning Signal
Guaranteed

Elyria-Dean products mfd. only by

THE DEAN ELECTRIC COMPANY
504 OLIVE STREET ELYRIA, OHIO, U. S. A.
Kansas City San Francisco, Cal.

"Look for Elyria-Dean where Quality's seen."

"VULCAN" SPRINGS

THE GOOD KIND



When next you are needing Automobile springs, we ask you to consider the Vulcan—a thoroughly good spring.

Stock on Hand to Fit:

Ford	Maxwell	Hudson
Overland	E. M. F.	Chalmers
Buick	Flanders	Oakland
Reo	Hupp	R. C. H.
Cadillac	Regal	Everett

JENKINS MFG. COMPANY
118 N. Third St. ST. LOUIS, MO.

Get acquainted with the standardized "Cole"

the car that is writing gasoline history.
Learn what the

**Cole franchise for
dealers**

will mean to you if you happen to be
located in open territory.



Cole Motor Car Co. of Indianapolis



Diamond
SAFETY TREAD
(Squegee) **TIRES**

Won't Slip - Won't Slide
Won't Skid - They Grip!

THE DIAMOND RUBBER CO. OF N. Y.
Subsidiary of The B. F. Goodrich Co.
Akron, Ohio

WANTED

**More Dealers to Sell
This Profit Builder**

5-Passenger
Coupe.
\$2900

The **Borland**
Electric

The Borland
Electric Roadster.
\$2550

Write or wire today for our attractive agency proposition and dealer discounts

THE BORLAND-GRANNIS COMPANY

Executive Offices and Factory
310 East Huron Street CHICAGO, ILL.

Enjoy good business during all of the year. Add the splendid BORLAND ELECTRIC to your line. Easy to sell—sure to satisfy. Big national advertising campaign now on. Local advertising assistance to dealers.

**Mosler
Spit Fire
Plugs**
are the BEST

FOR 13 YEARS HAVE BEEN LIKE THIS

INSIST ON OUR
GENUINE PLATINUM POINTED PLUGS

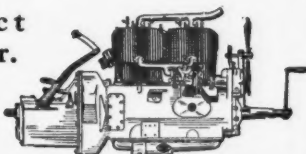
A. R. MOSLER & CO.,
P. O. BOX "M," MT. VERNON, N.Y.



Ergon Motors are "work" motors. Their Simplicity of design assures long life and ample power.

We never over contract our ability to deliver.

Three models. Model C, 3 3/4 x 4 1/2; model CX, 4 x 4 1/2; model D, 4 3/8 x 6.



HAZARD MOTOR MANUFACTURING COMPANY

PAIGE

Model "36" \$1275.00

A car whose design and construction is so far ahead of others at its price that it is in a class all its own.

Gray and Davis Electric starting and lighting equipment, silent chain cam shaft drive, four inch by five inch motor, cork insert multiple disc clutch, 116 inch wheel base, left side drive, center control, and equipment complete to the last detail.

Model "25" \$950.00

Electric Starting and Lighting System \$75.00 Extra

This model has made the Paige reputation. Such a sturdy, powerful, comfortable car has never been offered the public at anywhere near its price. \$950.00 with complete equipment.

Splendid Agency Proposition

PAIGE-DETROIT MOTOR CAR CO., 304 Twenty First St., Detroit, Mich.

SPLITDORF

"Always There"

The SPLITDORF "TS" TRANSFORMER is interchangeable with any type tube or dash coil and can be attached to any car. We will make a very liberal allowance on an old coil in exchange for one of the new style.

Write TO-DAY for particulars

SPLITDORF ELECTRICAL CO.

98 Warren Street, Newark, N. J.

PENNSYLVANIA
Oilproof
VACUUM CUP TIRES

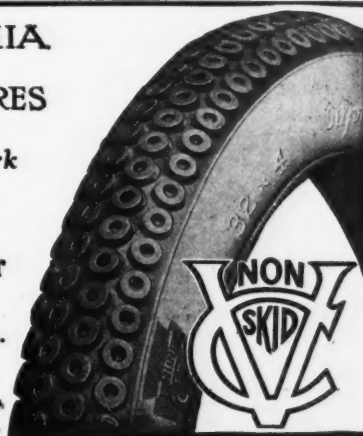
Making Their Mark
Everywhere

Pennsylvania Rubber
Company

Jeanette

Pa.

An independent company with
an independent selling policy



ZENITH

Gives
Standard
Carburetion

ZENITH CARBURETOR CO.
DETROIT, MICH.

FORD OWNERS
The 'BLITZ' Ignition System

Stops all of your ignition troubles.
Makes your car more efficient.
Uses Ford magneto current.
Eliminates the back kick.

Price \$20.00

Electrical Specialties
Mfg. Co.

Omaha, Neb.





Wide Choice Makes a Sure Sale

GIVE your customer six models to choose from instead of only two or three and he will begin to figure with you.

Show him the simplicity of Chase Trucks and he will understand their low upkeep.

Quote him the modest Chase Prices and you'll find you've sold a Chase Truck.

The proof is; we sell more light delivery trucks than any other concern in the United States.

Write Us Today

Chase Motor Truck Company
Dept. 1-5 Syracuse, N. Y.

The Searchlight Gas Co.

1016 Karpen Building

CHICAGO, ILLINOIS

Stronger than ever, legally, financially and in the esteem of the trade. Watch us grow.

BRANCHES AND REFILLING STATIONS:

Warren, Ohio	San Francisco, Calif.	Los Angeles, Calif.
Chicago, Ill.	Buffalo, N. Y.	New York City
Detroit, Mich.	Atlanta, Ga.	Syracuse, N. Y.
Camden, N. J.	Dallas, Texas	Minneapolis, Minn.
Philadelphia, Pa.	San Antonio, Tex.	Toronto, Canada
Kansas City, Mo.	Boston, Mass.	Indianapolis, Ind.

OUR 1914 Models will be revelations in mechanical features, refinements, finish, specifications, accessories and prices. Write for latest catalog and agency proposition for 1914.

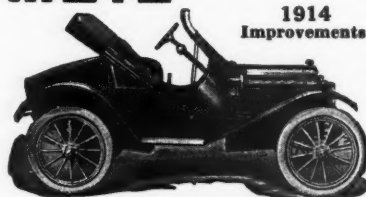
Pullman Motor Car Co.
York, Pa.

METZ "Twenty-Two" Roadster

THE GEARLESS CAR

1914
Improvements

"No clutch to slip—no gears to strip."



\$475

Completely Equipped

Center control, left-hand drive, 4-cylinder 22½ H. P. water cooled motor, Bosch magneto, standard artillery wheels, best quality clincher tires, extension top, windshield, five lamps, gas generator, tools, etc. Makes 5 to 50 miles per hour on the high speed, 28 to 32 miles on 1 gal. of gasoline, climbs hills as fast as ANY stock car made. A strong, reliable, stylish, fully guaranteed car. You can secure EXCLUSIVE SALE in your territory. Write at once for Book "K" and particulars.

METZ COMPANY

WALTHAM, MASS., U. S. A.

No Other Accessory Near So Essential as the

TRADE KANTALEVER MARK Emergency Spring Repairer

(Manufactured Under a Basic Patent)



Price, \$3.50

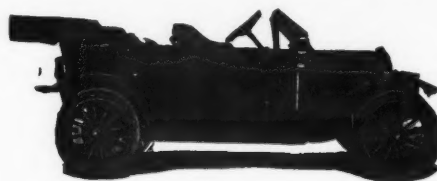
Repairer attached to spring broken in center at spring bolt—a common occurrence. Taken in time by attaching Spring Repairer there need be no cause for alarm. May be placed in other positions wherever springs are broken.

THE MOTOR CAR EQUIPMENT COMPANY

Sole Manufacturers

55-C Warren Street

New York City

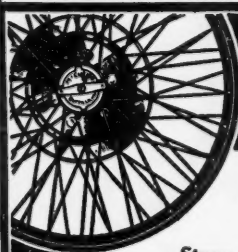


Marathon Automobiles

America's most comprehensive line. Every car completely equipped. 3 sizes chassis—10 body styles. Price range from \$875 to \$1800

Write for Catalogue M-A

HERFF-BROOKS CORPORATION, Indianapolis, Ind.



**M'CUE
WIRE
WHEELS**

Add a Big Percentage
of Tire Mileage

Strong, Resilient, Indestructible

These wheels are equipped with S Standard Sp' kes, made by the Standard Company of Torrington, Conn.

THE M'CUE COMPANY
Buffalo New York

KEETON
DETROIT U.S.A.

"SIX-48"
\$3250
Fully
Equipped

Write
for
Booklet

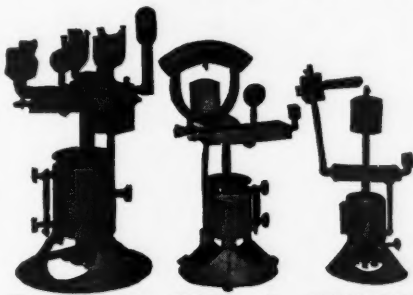
Riverside Touring Car

Keeton Motors Ltd.
Brantford Ont.
Canada

Keeton Motor Co.
Lawton & M.C.R.R.
PHONE WAL 1067 Detroit U.S.A.

HAYWOOD STEAM VULCANIZERS

THE PROFIT MAKING PLANTS



The vulcanizing system that DOES NOT use air bags. SOLID PADS and HEAVY CLAMPS are the means through which pressure is generated.

Plants from
\$25 to \$500

Write for Catalog B.

HAYWOOD TIRE & EQUIPMENT COMPANY
524 N. Capitol, Indianapolis, Indiana



The construction does it

You can always reduce tire expense on your motor vehicles by using

DAYTON Airless Tires

They ride easier and cause less vibration than pneumatic or solid tires. Consequently, your cars last longer and cost less to maintain.

Dayton Airless Tires cannot puncture or blow out, as they contain no compressed air. They last longer than the best solid tread made. Very liberal mileage guarantee. They fit all clincher rims.

Better ask us to show you how the Dayton Airless Tire reduces motor vehicle maintenance expense.

DAYTON RUBBER MANUFACTURING CO.
1005 Kiser St., Dayton, Ohio

MANIFOLD
AIR
GAS SAVER
No Automobile is Completely Equipped without it.

The Stewart Piston Gasoline Saver

Saves up to 40% 20% Guaranteed
INCREASES POWER INCREASES SPEED
SAVES YOUR BRAKES

Price \$6.50 Anywhere in the U. S. Ask your dealer, or write us.

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AUBURN 1913

"Rides Like a Pullman—Pulls Like a Locomotive"

38 Years' Manufacturing Experience
Built Into Every Model

Model 33M — Two Passenger Roadster; 33 H. P. long stroke motor $3\frac{1}{2} \times 5\frac{1}{4}$ — Price, \$1150.

Model 33L — Five Passenger Touring Car; 33 H. P. long stroke motor $3\frac{1}{2} \times 5\frac{1}{4}$ — Price, \$1150.

Model 40A — Two Passenger Roadster; 40 H. P. long stroke motor $4\frac{1}{2} \times 5$ — Price, \$1650.

Model Six—50—Six-Cylinder Touring Car, 50 H. P. long stroke motor $4\frac{1}{2} \times 5\frac{1}{4}$ —Price, \$3000

Model 40L — Five Passenger Touring Car; 40 H. P. long stroke motor $4\frac{1}{2} \times 5$ —Price, \$1650.

Model Six—45B—Two Passenger Roadster, 45 H. P. long stroke motor $3\frac{1}{2} \times 5\frac{1}{4}$ — Price, \$2000.

Model Six—45—Five Passenger Touring Car, 45 H. P. long stroke motor $3\frac{1}{2} \times 5\frac{1}{4}$ — Price, \$2000.

Send for 1913 Catalog

AUBURN AUTOMOBILE COMPANY, Auburn, Ind.

The LAMBERT

The LAMBERT Model 99 (5-passenger touring car or 2-passenger roadster) at \$1365 (fully equipped) stands at the head of its price class. It comprises $4\frac{1}{2} \times 5\frac{1}{4}$ Rutenber motor, 117" wheelbase, famous LAMBERT friction drive, one lever control, etc. Write for catalog.

BUCKEYE MFG. CO.
ANDERSON, IND.

Cross-Rolled Steel in Springs Cuts Up-Keep

In this new process, the steel is worked both longitudinally and transversely. So we get superior strength and toughness. We use this process exclusively in our Chrome-Vanadium Brand of Springs.

Find out more about them. It will make a tremendous difference in the riding qualities of your car.

Best Grade—Chrome-Vanadium
Next Best—Special Analysis



In five years not one Cleveland - Canton Chrome - Vanadium spring returned because of breakage or settling.

Let us send you full particulars

The Cleveland-Canton Spring Co., Canton, Ohio, U.S.A.

Corcoran Lamps

GAS, OIL, AND ELECTRIC
CORCORAN LAMP CO.
CINCINNATI, OHIO

STAPLEY TIRE PUMP


Made by Bridgeport Brass Co.

Increases the Life of Tires

The STAPLEY makes it easy to keep tires properly inflated. It is an efficient Compound pump of the finest materials and workmanship; it is always ready and always works.

Price without Gauge \$4.00 With Gauge \$6.00

THE BRIDGEPORT BRASS CO.
P. O. Station A Bridgeport, Conn.



RAYFIELD CARBURETOR

More power - Less fuel - Wider range

FINDEISEN & KROPP MFG. CO.
2157 & ROCKWELL STS., CHICAGO, ILL.

LINDHE "LAMINATED" SHIM METAL
PATENTED IN U.S.A. AND ALL FOREIGN COUNTRIES
STOCK SHEETS 6" WIDE BY 36" LONG

LINDHE "LAMINATED" SHIMMING BRASS

with Laminations of .002" or of .003".
For Adjustments of Bearings. No More Filing.

A perfect reduction is obtained at once simply by loosening one corner of a layer with a knife or other sharp instrument and peeling it off. The rest of the shim remains as solid as ever.

Stock Sheets and Box Assortments of Strips—On sale by all leading Jobbers and Dealers.
Special stamped shapes supplied to manufacturers when desired.

LINDHE SHIM CO., 210-212 Canal St., NEW YORK
RHINELAND MACHINE WORKS CO., 140 W. 42d St., N. Y.
(Sales Agents for the United States)

How Largest Profits are Made

Henderson
De Luxe, \$1785



We have some interesting facts in connection with increasing your car sales and profits.

Selling some cars, you may sell large numbers—and still your yearly business shows a loss.

Through merchandizing strategy, we have remedied these flaws. May we tell you about these things and about our kerosene-burning car, equipped with wire wheels, cowl dash, cowl gasoline tank. Left drive, center seat control—the most salable car offered today.

Wire or write for the facts

Henderson Motor Car Co.

Indianapolis, Indiana

HENDERSON



DON'T THROW AWAY YOUR OLD TIRES
COVER THEM WITH **STEEL**
AND USE THEM FOREVER

SKID BLOWOUTS RIMCUTS PUNCTURES WEARING OFF OF RUBBER NIT

Each section 2 in. wide. They hook to rims. Try two or three sections over any old blowout.

Special Prices to the First in New Territory
KIMBALL TIRE CASE CO., 173 B.W.D., COUNCIL BLUFFS, IA.

PATHFINDER

WORTHY OF THE NAME

THE PATHFINDER car is an unusual combination of mechanical virtues. Each detail is standard in design, workmanship, and quality materials.

The Pathfinder chassis is a composite of the best proven ideas in European and American practice—built to withstand rough usage and to remain quiet even in "old age." The Pathfinder "selling plan" is one you will be glad to know about. It is unique and comes to you in the form of the "101 Reasons," a short, concise course in Pathfinder salesmanship. Yes, it is absolutely different—better write today, NOW!

Just ask for—
"Photo Story of a Pathfinder"
"100 and 1 Reasons"

THE MOTOR CAR MFG. CO.
Indianapolis, U. S. A.

IDEAL STEEL WHEEL

(RESILIENT)

STRENGTH COMFORT BEAUTY ECONOMY

IT'S IN THE SPOKES

Makes possible the use of airless tires without sacrifice of easy riding.

Doubles the life of any set of tires.

Increases life of motor and adds to the mileage per gallon of gasoline or per charge of electricity.

Makes any car ride like a cradle.

TRY THEM AT OUR RISK

Supply Dealers and Garage Owners:
Write for our agency proposition.

The Ideal Steel Wheel Company
4619-4633 Spring Grove Ave. Cincinnati

Oakland

The Car with a Conscience

OAKLAND MOTOR CAR CO.
PONTIAC MICHIGAN

Four & Six Cylinders
\$1000.
to
\$3000.
Write for Literature



Standardized Transmissions

COVERT

Covert Motor Vehicle Co. Sales Office Detroit
Factory Lockport N.Y.

When Writing to Advertisers, Please Mention Motor Age.

Raybestos REG. U.S. PAT. OFF.

TRADE MARK

Raybestos

REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

Raybestos REG. U.S. PAT. OFF.

It Made the Automobile Safe. Do not accept substitutes. RAYBESTOS is the standard brake lining of the industry. The name is stamped on every foot for your protection.

The Royal Equipment Co.
Bridgeport, Conn.

1914 *Marion* 1914

SEND to us today for advance folders which tell all about the big, new six-cylinder MARION. See the advertisements in all trade papers; wire us about our unusual dealers' contract for 1914.

THE MARION MOTOR CAR CO.
902 Oliver Avenue, INDIANAPOLIS

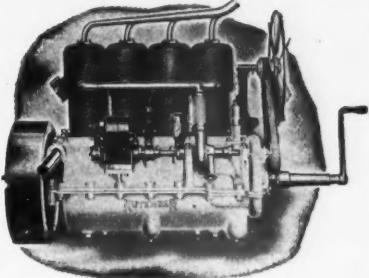
THE RUTENBER MOTOR

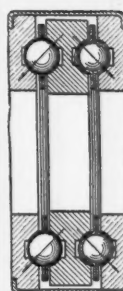
MANUFACTURED SINCE 1901 FOR HIGH GRADE
AUTOMOBILES and TRUCKS

8" x 5" four and six cyl.
4" x 5" four and six cyl.
Standard or Unit and
4 x 4, 4" x 5 and 4" x 5
Standard Types. All L
Head 4 Cycle.

Manufacturers are invited to investigate our service and our facilities. Literature on request.

The Rutenber Motor Company
Marion, Indiana





SUSPENSION BALL BEARINGS

The arrows on the cross section show how the load is evenly carried by upper as well as lower balls, making the only perfectly balanced radial bearing, and at the same time an ideal thrust bearing. This Double Row Ball Bearing will carry a greater load than any other ball bearing.

Races made from solid, special analysis steel. Specially selected alloy steel balls. Maximum size and greatest number of balls. Greatest bearing surface between race and balls. Closest limits of guaranteed accuracy.

Now used in motor cars, machinery, and to equip our Special Shaft Hangers. We also make plain and grooved thrust bearings.

WRITE FOR BOOKLET M

SUSPENSION ROLLER BEARING CO., Sandusky, Ohio

Guide

DEALERS' PROPOSITION

Our dealers make money. We help them move the goods and Guide lamps make satisfied customers. Write for our proposition.

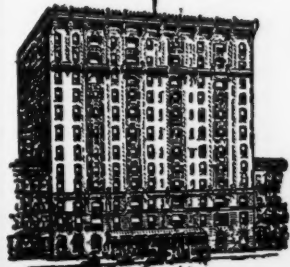
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East 4th Street (36) Cleveland, Ohio

You Can Walk From There to Anywhere.

THE WOODSTOCK

The Hotel of Comfort

43rd St., Just East of Broadway, New York



Our new addition is ready for occupancy. We now have 360 rooms with 265 baths. Write us for descriptive folder with typical floor plan and rate card. Wire for reservation at our expense.

Rates
From \$2.50 to \$4.00 Per Day

W. H. VALIQUETTE
MANAGER

Also The Berwick, Rutland, Vt.

Premier

America's
Greatest Touring Car

PREMIER MOTOR MFG CO.
INDIANAPOLIS IND.

Patented



Manufacturers Don't omit a SPARKS-WITHINGTON of 1914 Models. Our Fan from your 1914 specifications. Our One-Piece blade, ball-bearing, radiator fan assemblies cool the motors of more high-class cars than any other fan on the market. There's a reason. SPARKS-WITHINGTON Fans deliver the greatest volume of air with the least H. P. consumption of any fan obtainable. Furthermore, their one-piece construction is positive insurance against blades which loosen, become detached and fly off. Undoubtedly one of our ten standard models is just what you have been looking for. Catalogue and detailed blue-prints on request. Get in touch with us.

The Sparks-Withington Co.
JACKSON MICHIGAN - WALKERVILLE CAN.

The 6-Cylinder, Reasonably Priced

de Soto 55 H.P.

The car with a stronger appeal than any recent product of the trade—the one that meets a popular demand. We have an unusually attractive proposition for dealers. Write at once for free catalog and full particulars.

Sells for
\$2,185



de Soto Motor Car Company, Auburn, Ind.

GOOD YEAR
AKRON, OHIO

This name on Automobile Tires and Rubber Accessories signifies inherent qualities of material and workmanship that insure the maximum of service at the minimum of expense.

(673)

THE GOODYEAR TIRE & RUBBER CO.
AKRON, OHIO

McFARLAN

Electric **SIX** Self
Lighted Starting

SERIES "S"—45 H. P., 2, 4 and 5 Pass.—\$2,300
SERIES "T"—50 H. P., 2, 4 and 5 Pass.—\$2,500
SERIES "M"—60 H. P., 2, 4, 5 and 7 Pass.—\$2,750

New Six Passenger, Coupe and Limousine
Bodies slightly higher.

TERRITORY OPEN FOR PROGRESSIVE DEALERS
Pioneer Six-Cylinder Car Builders of America
McFARLAN MOTOR CAR CO., Connersville, Ind.

STAR
BALL RETAINERS

STAR BALL RETAINERS are famous wherever ball bearings are known. The best bearing service attends the car equipped with STAR BALL RETAINERS. We also manufacture more thrust bearings than any concern on the market. Send us your requirements.

THE STAR BALL RETAINER CO.
LANCASTER, PA.

HESS AXLES

HESS Axles have been on the market but 2 years. Fourteen car manufacturers in that short time exclusively adopted them as regular equipment.

Renewals of HESS contracts for 1913 from past users and an increasing HESS demand among new manufacturers, is ample proof of the stability of HESS Quality.

May we be of service to you? Write us.

THE HESS SPRING & AXLE COMPANY
Carthage, Ohio, U. S. A.

Cadillac

Gearless!
Not even a clutch!
The simplest car made—
unlimited speeds—one lever
control—climb steep hills.
Twice the usual tire mileage.
Send for Catalog
Cadillac Company,
Pontiac,
Michigan



Over 3000

Jobbers and Dealers in the United States Now Recommend and Sell the Michener Chain Carbon Remover.

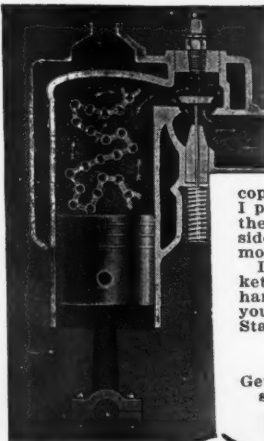
Being a flexible chain, made of a light gauge wire, a special composition, 90% copper, it cannot scratch or score a cylinder. I positively guarantee that it will remove all the carbon from the piston head, top and sides of cylinders without injury to the motor.

It is the only carbon remover on the market today that will absolutely remove the hard scales of carbon. Get two chains and you can clean two cylinders at the same time. State kind of motor when ordering.

Price 75c, or 3 for \$2.00

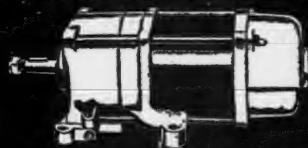
Get them from your dealer, or if he cannot supply you, I will send direct postpaid.

E.S. MICHENER WASHINGTON ST., NEW CASTLE, PA.



Shows Chain in Operation

JESCO ELECTRIC
STARTING
& LIGHTING
TRADE MARK
ASSURES 100% EFFICIENCY



JONES ELECTRIC STARTER CO.
ADAMS & LOOMIS STS. CHICAGO, ILL.

MIRROROIDE METALIZED GLASS BRONZE

will help to keep your engine in tip-top shape. It is a metallic paint that gives a smooth yet high gloss to anything that it covers.

MIRROROIDE will stand the highest heat of any motor without burning off or losing its lustre. In fact, it will stand a heat of 2200°.

MIRROROIDE is *absolutely the best* protection on the market for engines, radiators, fans, etc. Can be had in gold, silver, aluminum and copper.

PRICES { One-half Pint..... 90c One Quart.....\$2.00
 One Pint.....\$1.25 One Gallon\$7.00

Try a can TODAY. Sent prepaid upon receipt of price.

THE J. H. GENTER CO., Inc.
NEWBURGH, NEW YORK

Dealers: Keep MIRROROIDE in stock. It sells easily and leaves a mighty good profit. Get our dealers' offer now.

HERZ PLUG

"Bougie Mercedes"

One great point of overwhelming superiority in HERZ PLUGS is the unbreakable Double-Stone Insulation, which replaces the porcelain of ordinary plugs. The inner stone is ground into the steel fitting, without packing. The outer stone is Blue Enameled, a feature by which HERZ PLUGS can readily be recognized.

Other important Herz features are the Four Sparking Points, the Platinum-alloy Electrode, and the self-cleaning construction. Every Herz Plug is

Guaranteed a Full Year

HERZ & CO., 295 Lafayette St., N.Y.
Makers of the HERZ MAGNETO



Any Kind
Every Kind
Stock, or
to Blue Print

Rims

Clincher
Q. D.
Demountable
Channels

For Automobiles, Motor Trucks,
Aeroplanes, Motorcycles, Bicycles

We Also Make Axles and Hubs.

MOTT WHEEL WORKS, Utica, N. Y.

R. B. ABBOTT SALES CO., Sales Agents, Detroit

THE ROBBINS SEDAN BODY

You have seen it—and admired it. Probably you did not know that it was a Robbins body. Probably you have wondered whose design and construction produced that handsome Sedan.

For your own comfort, you will need a Sedan body this winter.

LET US DESIGN IT

IRVIN ROBBINS & COMPANY

Address Sedan Dept. 10th and Canal, Indianapolis, Ind.

Stewart Speedometer

MAGNETIC PRINCIPLE

Approximately 450,000 cars will be built during 1913 and 400,000 of these will be equipped with a magnetic speedometer—like the Stewart.

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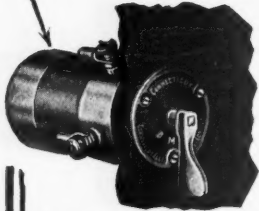


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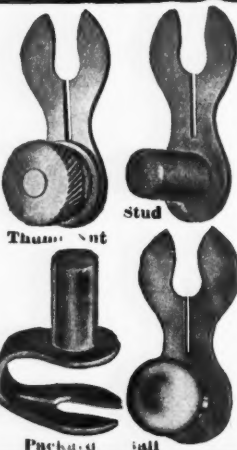
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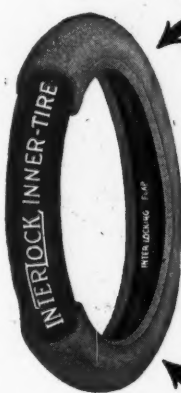
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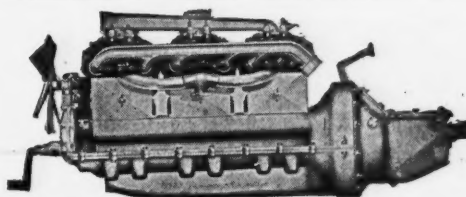
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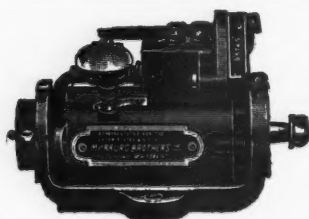
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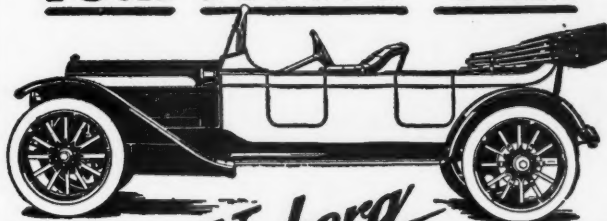
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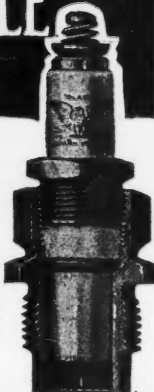
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FORE-DOOR BODIES, SIX AND SEVEN passenger; painted, not upholstered. Price, \$25.00.

AUTOMOBILE APPLIANCE CO., 1714 S. Michigan Ave., Chicago, Ill.

FORE DOORS.

This is the time of the year to order doors for your car, as we are not so busy and can make prompt shipment. We make the doors to fit your car or money returned. F. E. Lortz Company, Cleveland, Ohio.

FORE-DOORS AT CUT PRICES.

Mr. Auto Owner and Dealer: If your car is without fore-doors, write today for bargain prices; to reduce stock.

DEPT. D., AUTO SPECIALTY MFG. CO.,

326-30 E. Market St.,
Indianapolis, Ind.

FOR SALE—COMPLETE CHARGING REC-tifier for electric automobiles, together with automatic shutoff. Apply Oscar Greenwald, care Gimbel's, Milwaukee, Wis.

FOR SALE—ONE BRAND NEW BOWSER side walk pump complete, in original factory crate; has not been opened. Address P. O. Box 687, Greenville, S. C. t

FOR SALE—VELVET AUXILIARY springs, 150 pairs; entire lot or in small quantities, while they last, at a very reasonable price. Don't miss this bargain—write quick. Stutz Motor Car Co., Desk A-2, Indianapolis, Ind.

FOR SALE—60 H. P. THOMAS ENGINE \$100.00—Model B, K. W. Low Tension Magneto Generator \$10.00—D 6-Dual Bosch Magneto \$55.00. Olds single cylinder run about \$35.00. Auto Salvage Co., 1436 Wabash Ave., Chicago, Ill.

FOR SALE—\$2,000 STOCK OF ESSENKAY, sizes 3 to 5 inch, inclusive. Will sell at 75 per cent off list price. The Marksheffel Motor Company, Colorado Springs, Colo.

FOUR-CYL. BUDA MOTOR

For Sale—4½"x5¼"—2" drop, 17½" sub-frame. Bosch D U 4 Dual Magneto. Both in good condition and running order. Taken from Michigan 1912 car. Magneto alone cost nearly \$50.00. Bargain. Price, \$195.00. Write quick.

FULLER & SONS MFG. CO.,
Kalamazoo, Mich.

GET WRIGHT

Radiators for Replacement. Built for any car made. Prompt shipment. Get our prices.

Specials This Month.
Buick 17—\$34.00 Velle 30—\$30.00
Hudson 20—\$32.00 Hupmobile 32—\$30.00
Wright Cooler & Hood Co.
8th St., Muskegon, Mich.

GUARANTEED RADIATORS

For all cars. The following is our stock list of radiators for the cars mentioned, subject to immediate shipments. Compare our prices with other lists.

Ford Model "T".....	\$18.00
Buick 10-32-33-14.....	27.50
Buick F-16-17-19-26-27-28.....	35.00
Buick 38-39.....	42.50
Hudson 20.....	33.00
Chalmers F-40.....	30.00
Lion 40.....	25.00
Warren 40.....	28.50
E-M-F 30.....	30.00
Flanders 20.....	30.00
Brush A-B.....	17.00
Anhut.....	15.00
Northern C.....	32.00
Wayne 30.....	35.00
Special 40 H. P.....	15.00

Terms: One-third cash with order, balance with order.

When ordering state year.

AUTO PARTS MANUFACTURING CO., 463 Trombly Avenue, Detroit, Mich.

GOULD \$50.00 AIR COMPRESSORS FOR \$18.00. Ford outfits \$4.00 complete. Fred Allen Automobile Supply Co., 1610 S. Michigan Ave., Chicago, Ill.

JUST OUT

NEW 128 PAGE BARGAIN SHEET

THIS IS OUR REMOVAL SALE

SPECIAL BARGAINS

10 A-3	12x8x10½	Standard Steel Tool	Each \$1.50
35 B-2	14x8x9½	and Battery boxes	Each 1.75
102 B-3	14x8x10½	.....	Each 1.85
565 B-4	16x8x8, with partition	.....	Each 2.00
58 B-4	16x8x8, less partition	.....	Each 1.85
42 B-5	16x8x9½	.....	Each 1.85
90 B-6	16x8x10½	.....	Each 1.85
54 Federal	16x9x10½	.....	Each 1.85
40 T-11	20x9x9	.....	Each 2.50
291 Ford	22x9x6	.....	Each 2.50
97 T-14	22x9x9	.....	Each 2.50

AUTO PARTS CO., 513-31 Jackson Blvd., Chicago, Ill.

LATEST FORD ROADSTER BODY, \$35. Tops, curtains included. MacInnis Bros., Toledo, O.

LION REPAIR PARTS.

We have on hand a complete stock of repair parts for all models of Lion Cars. Lion Motor Parts Co., 124 N. 3rd St., Philadelphia, Pa.

MR. (FORD) OWNER AND GARAGE MAN.

The Townsman Valve Adjuster has a cushion for your valve-stems. Takes away the click, absolutely silencing the valves. No screws or burrs to work loose. Saves putting in new push-rods and valve-stems. They never wear out. Price \$1.50 by mail. Ask your jobber, or address Townsman Auto Specialty Co., Mitchell, S. D.

MAGNETOS: WE HAVE 2,000 MODEL X Splittorf Magnets, new. Price, without coil, \$17.50 each; with coil, \$25.00 each. The regular price of these is \$75.00.

We also have other makes of magnetos at cut prices, in fact, everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money saver in the world.

TIMES SQUARE AUTO CO., 1210 Michigan Blvd., Chicago, Ill.
S. W. Cor. 56th St. & Broadway, N. Y. City.

	Reg. Price	Cut Price
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Master Vibrator.....\$10.00 \$ 5.60
Ford seat covers, complete with top hood..... 25.00 10.50
Ford rear end tire holders.... 4.00 2.25
Send for 96-page illustrated cut price catalogue.

Dept. S, Liberty Tire Co.,
102 Chambers St., New York City.

MORA REPAIR PARTS.

We purchased the repair business of the Mora Company and have in stock repair parts for all models of Mora cars. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

"OWNERS NOTICE."

CARBON IN YOUR CYLINDERS Will cause you more trouble than enough. M. H. B. CARBON REMOVER eliminates engine trouble, reduces repair bills, apply it yourself.

ACTS LIKE MAGIC. Guaranteed to do the work or money refunded. Price \$1.00 per quart prepaid. Use 2 ounces (liquid) to one gallon of oil. Dealers, write for special proposition. Interstate Mfg. Co., Inc., Walliston, Mass.

OXY-ACETYLENE WELDING AND CUT-ting machine. The Admiral Welding Machine is built by men who know; large capacity self-generating; portable; perfect for all classes of work. Send for booklet, "Welding and Cutting." Price, with Welding and Cutting Torches, all Filler Rods, Fluxes, Chemicals, etc., ready to begin earning big money, \$25.00.

We do expert welding; prices right. Admiral Welding Machine Co., 1331 Walnut St., Kansas City, Mo.

OIL YOUR FORD FROM THE SEAT.
Pedersen Sight Feed Lubricator affords smoother running motor, fewer repair bills. Price \$15.00, ready to attach.
Rowland & Lopez,
1777 Broadway, New York City

RADIATORS

To order for all cars.
We use copper fins and tubes.
You can buy brass cheaper, but the cooling efficiency is not there.
Black enamel, baked finish, \$2.00 extra.
Terms cash with order, or one-third deposit with C. O. D. shipments.
\$5.00 Trade Allowance for old radiator shipped in F. O. B. Detroit.

Ford Model T.....	\$22.00
Ford Model R. S. & N.....	28.00
Hupmobile 1910-1911.....	28.00
Hupmobile 1912-13.....	38.00
Warren 1910-1911-1912.....	35.00
Packards to sample, \$50 to.....	65.00
E. M. F. 30.....	35.00
Flanders 20.....	30.00
Patterson 30.....	35.00
Buick 10-14-32-33.....	30.00
Buick 16-17-19-26-27-28.....	35.00
Hudson 20.....	32.00
Hudson 33.....	40.00
Cadillac 30.....	35.00
Paige 1910-1911.....	28.00
Paige 1912.....	30.00

SPECIALS

Electric tail lamps, complete, each.....	1.25
12" bullet headlights, complete, pair.....	12.00
1 model F Thomas radiator, cellular type.....	40.00
R. C. H. headlight, 8", pair.....	3.00
Vehicle lamps, red and white light, each.....	.75
Oil tail lamps, each.....	1.25
Oil side lamps, pair.....	3.00
Regal 30 dashboards, each.....	1.00
15" Barnes' drill, good as new.....	33.00

HURON RADIATOR & LAMP COMPANY,
253-255 Jefferson Ave., Detroit, Mich.

OWNERS — DEALERS

Write for our bargain list on accessories, windshields, 34 x 3 1/2 tires, models J. & H.-K. & W. magnetos, axles, Ford equipment, springs for any car manufactured in Michigan. F. & S. and N. D. ball bearings, in fact everything and anything for the automobile.

NOTICE, GARAGE OWNERS:

Write us for our special bargain list on machinery and tools.
AUTOMOBILE SUPPLY & MACHINE CO.,
718 Free Press Bldg., Detroit, Mich.

RADIATORS—NEW GUARANTEED GOODS

Ford, Model T.....	\$16
Buick, Model 10.....	22
Buick, Model F.....	25
Chalmers-Detroit.....	20
Everett.....	20
Stoddard-Dayton.....	25

Any other make required at equally low prices.

Times Square Automobile Co.,
1210-1212 Michigan Ave., Chicago.

RADIATORS, 40 TO 60 HORSEPOWER, \$22.

Get our list of bargains.
AUTOMOBILE APPLIANCE CO.
1714 S. Michigan Ave., Chicago, Ill.

REAL BARGAINS IN MOTORS

Unit power plants, radiators for all standard makes of cars. Windshields, \$7. Side oil lamps, brass or black, \$2.75 pair. Gas or electric head lights, 8 1/2 to 9 inches, \$6 per pair. \$1 spark plugs, 20c. Universal joints, steering gears and other parts for cars at bargain prices. Write today to

Nichols Company

424 Grand River Ave.,
Detroit, Mich.

SEAT COVERS FOR ALL CARS

Special price on Ford seat covers. We make a specialty of Ford commercial bodies.
Auto-Cape Top Co.,
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SHINAUTO, THE NEW PROCESS FOR
keeping your new auto looking new and making your old car look like new, without washing. Removes all rain spots and keeps varnish from checking and cracking. Send 75c in stamps or postal order for a sample can.

Shinauto Mfg. Co., Inc.,
114-120 W. 16th St. Indianapolis, Ind.

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25 K-W Magnetos. Each.....	\$ 20.00
Four cylinder Mitchell 3 1/2x4 motor, fitted with timer and spark coil....	75.00
Four cylinder Rider-Lewis motor, 4x5, with cone clutch and cork inserts, cylinders cast en-bloc.....	75.00
Two cylinder Northern motor, fitted with planetary transmission, water pump, timer and oiler.....	65.00
Two cylinder opposed Kiblinger air-cooled motor, 10 h. p.....	35.00
Four cylinder upright air-cooled motor new.....	60.00
Two cylinder opposed 20 h. p. Davis motor.....	80.00
Two cylinder opposed Sears motor with carburetor, oiler and coll.....	50.00
Four cylinder Continental motor, second hand, 3 1/2x4.....	70.00
50 h. p. American-British new motor.....	225.00
Jackson planetary transmission.....	25.00
Olds sliding gear transmission.....	65.00
Pressed steel frames, all sizes. Each.....	10.00
Randolph one-ton truck motor, new.....	75.00
Two cylinder, two cycle opposed motor, new.....	35.00
Auto tops, nearly all sizes.....	18.00
Ford radiators, Model T.....	18.00
Model N, R and S.....	28.00
Utility spark plug pumps.....	9.00
Upholstered racing seats. Per pair.....	20.00

Send for our Brannen & Wicker Inventory Sheet. Goods on this sheet are cheaper than can be bought from the manufacturer.

CUT PRICE AUTO SUPPLY CO.

438 Rush St.
Chicago, Ill.

"SAVE YOUR GASOLINE."

We have 150 Rayfield carburetors, regular \$20.00 kind. Our price, \$8.20 while they last.
PURITAN MACHINE CO.
415 Lafayette Blvd., Detroit, Mich.

TOURING, ROADSTER, RACING BODIES.

Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.

Auto Sheet Metal Works,
1534 Michigan Ave., Chicago.

TOPS BUILT, RECOVERED AND REPAIRED.

C. G. Meyer & Son, Tiffin, Ohio.

TRUFFAULT-HARTFORD SHOCK ABSORBERS: \$45.00 kind; \$20.00 set of four.

PURITAN MACHINE CO.
417 Lafayette Blvd., Detroit, Mich.

TWO CYLINDER ENGINE, \$20; REAR axle for small car, \$12.

M. A. Smith,
Lansdowne, Pa.

UNION OXY CARBIDE CO.

Manufacturers of Portable (weight 40 lbs.) and stationary welding, cutting or lighting plants; supplies of all kinds. Agents wanted. Fulton & Enfield Sts., Brooklyn, N. Y.

WE MAKE FORD RACING TYPE BODIES

in several models for immediate delivery.
AUTO SHEET METAL WORKS
1532 Michigan Ave., Chicago, Ill.

WE NOW HAVE BUT A FEW 30-35 AND 35-40 H. P. motors ready for shipment.

Complete with magneto, coil and clutch. F. E. Alford, Goshen, Ind.

WESTON MOTT HIGH GRADE REAR axles, \$45.00. Other bargains, too.

PURITAN MACHINE CO.
413 Lafayette Blvd., Detroit, Mich.

WRITE THE GUN METAL FINISH CO.,

313 Powers Bldg., Decatur, Ill., for free samples of ELECTRO-KNICKEL POWDER, for plating automobile trimmings. Will put on as heavy a coat of metal as an electroplating bath.

4 CYL. 4 CYCLE, 25 H. P. NEW MOTORS, overstock, 3 bearing crank shaft, large bearings, self-contained oiling system, complete with timers and carburetors, \$105.

Kermath Manufacturing Company,
Detroit, Michigan.

50 NEW PRESSED STEEL FRAMES 163" long, 34" wide. Each \$10.00. Send for sketch.

Lucas & Son, Bridgeport, Conn.

Cars Wanted

FIFTY CARS WANTED FOR CASH

Have customers waiting; if you want to sell your car quick, consign it to us; no charge whatever; we get our profits over your net figure; it is your privilege to remove car at any time without notice; will send for your car free within 200 miles.

American Used Motor Car Co.,

Brooklyn, N. Y.
500 Bergen Street Near Flatbush Ave.

FORD CAR STOLEN

License No. 74987 Ill., car No. 165,791, engine No. B8862. Notify M. Bristle, Sheriff, Ford Co., Ill., and obtain reward of \$50.00.

FOR SALE—QUARTER SECTION IMPROVED land in Minnesota, at a bargain. Will take 1913 Roadster as part payment. Address Box D 505, c/o Motor Age.

For Sale or Exchange

FOR SALE OR TRADE

A one-ton Buick truck. \$700, if taken at once.

A large 1910 5 passenger 40 H. P. Mitchell, detachable tonneau, 4-inch tires; will make fine truck and pleasure car combined, \$450.
Albany Automobile Co.,
Albany, Wis.

Parts and Accessories WANTED

WANTED—TRANSMISSION JACKSHAFT suitable for 2-ton truck.

F. B. Cavanagh,
Hebron, Ind.

WANTED—PREST-O-LITE TANKS. WE pay the following prices:

A. Presto Tanks (large).....	\$9.00
B. Presto Tanks (medium).....	7.50
E. Presto Tanks (small).....	6.00

Ship in any quantity C. O. D. or S. D. B. L.
ERWIN GREER & COMPANY,
1456-64 Wabash Ave., Chicago, Ill.

Situations Wanted

AUTOMOBILE ENGINEER WITH EIGHT years' designing and 12 years' shop experience with exceptional mechanical, inventive and executive ability, seeks a situation in production or engineering. Write Box D 477, c/o Motor Age.

POSITION WANTED AS FOREMAN OF automobile repair shop by first class mechanic of long experience. Desires a position that will be permanent and where good salary will be paid for faithful and efficient service. West or Northwest preferred. Address Box D 501, c/o Motor Age.

POSITION WANTED BY AN EXPERIENCED mechanic and driver, with some northern owner of a high-grade automobile, as chauffeur during the summer and fall; absolutely sober and reliable; for further particulars address Box D 447, c/o Motor Age.

PURCHASING AGENT, YOUNG MAN, SIX years' experience with largest automobile companies, wants connection October 1. Highest references furnished to prove I am a producer. Address Box D 504, c/o Motor Age.

SALES MANAGER

of known ability and experience desires to make a change after September 1. I have been identified with leading car manufacturer as district sales manager, with headquarters in Chicago. Thoroughly competent with first-class references. Address J. R. D., 1416 Dearborn Ave., Chicago.

WANTED—POSITION WITH SOME AUTO firm year around by expert mechanic; also specially good on carburetor coils and magnetos. Would consider job as demonstrator. F. A. Harvey, Tracy, Iowa.

Help Wanted

BIG MONEY SELLING OUR LINE. \$10.00 to \$50.00 profit on each sale. Great demand. Experience unnecessary. Exclusive territory to hustlers. Write C. Hemple, Sales Mgr., 175-F No. Sangamon, Chicago.

ENGINEERS, SUPERINTENDENTS, Works Managers, Designers, Production and Efficiency Engineers, and Draftsmen with automobile experience. Inquiries confidential; record must stand investigation when desired. The Engineering Agency, Inc.—20th Year—Chicago.

EXPERIENCED AUTOMOBILE MEN Wanted. For every branch of the industry. We are Automobile Position Specialists and a member of S. A. E. The Toledo Engineering Agency, Toledo, O.

WANTED—AN A1 MECHANIC WHO IS wide awake and can handle men and get results in shop working ten men. Must have special knowledge of Hudson cars and Delco system. Box D 507, c/o Motor Age. w

WANTED—AN AUTOMOBILE SERVICE Manager competent to assume entire charge of all road work of the service department, including the employing and supervising of the work of service men under him.

Address Palmer & Singer Mfg. Co.,
Long Island City, N. Y., or
Western Branch, 2638 Michigan Ave.,
Chicago, Ill.

WANTED—FIRST CLASS MOTOR ASSEMBLERS; three to four years' experience required. Apply Employment Department, The Kelly-Springfield Motor Truck Co., Springfield, Ohio.

WANTED: NEAT APPEARING AUTO MECHANICS, with good references, in all small towns to make installations of automobile devices for us. Address: Halliwell Co., 408 West Pico St., Los Angeles, Calif.

WANTED—THOROUGH AND EXPERIENCED factory superintendent for assembly proposition. Must be familiar with body painting and trimming. Address, giving full particulars, references and details. Address Box D 473, c/o Motor Age. v

Business Opportunities

AUTOMOBILE BUSINESS FOR SALE— Paying about six to eight thousand dollars yearly. Wife's health such, have to move Southwest. No cars and light stock supplies on hand. Box D 508, c/o Motor Age. e

CONTROLLING INTEREST IN TAXICAB business in prosperous city of 50,000 may be purchased at a reasonable price; half down, balance on time. Owner has other business interests. For full particulars, address Box D 474, c/o Motor Age.

FOR SALE—MACHINE SHOP AND GARAGE, with residence; fine location. The above will invoice \$13,000, will sacrifice for \$9,500 for quick sale. No trade. For particulars, write Jos. Slagel, Fairbury, Ill.

GARAGE FOR SALE. In Southern Indiana, 50x150, concrete construction, concrete floor, no posts, everything modern. City of 8,000 population. Takes (\$10,000) to buy building, ground and stock. Inquire Box D 497, c/o Motor Age. mc

LET US DO YOUR DESIGN, LAYOUT, WORKING DRAWINGS, TRACING, PATENT DRAWINGS OR ANY OTHER DRAFTING WORK CONCERNED WITH AUTOMOBILE, CYCLE CAR OR GAS ENGINE CONSTRUCTION. OUR DESIGNERS HAVE HAD YEARS OF PRACTICAL EXPERIENCE IN BOTH AMERICAN AND EUROPEAN MOTOR CAR WORK. FOR GOOD QUICK RESULTS, WRITE
DETROIT ENGINEERING COMPANY,
DETROIT, MICH.

VULCANIZING PLANT—LARGEST AND best equipped plant west of Chicago, only one in town of thirty thousand people. Reasons for selling, business opportunity in the South. Good paying proposition for right party. Address Babcock Tire & Rubber Works, Burlington, Ia.

WE WANT TO GET IN TOUCH WITH men of experience in selling heavy machinery, who have capital that they want to invest in a profitable business; men who are capable of taking charge of a branch house for the selling of the Hackney Auto-Plows. You handle your own money. This is a chance of a lifetime.
HACKNEY MANUFACTURING COMPANY,
St. Paul, Minn. n

WANTED.—MANUFACTURER .FOR .A spark plug. Address
Estes & Inman,
Midland, Texas.

Tires

TIRE OPPORTUNITY FOR FORD OWNERS

Your opportunity if you own a Ford, have salesman's ability, and live in a small town where we have no agency for

STODDARD'S FORD TIRES

Twenty-five per cent Heavier—Tougher—and Stronger cases—and Heavy Red Tubes.

These tires make your car ride easier—give you more mileage, save too frequent blowouts and other tire trouble.

We make 30 x 3½ and 30 x 3 cases and tubes only—make them in large quantities from the best Para Rubber procurable and 400 lb. test fabric. But by eliminating detail expense necessary in factories where 104 different sizes and types are made we have reduced manufacturing costs and pass this saving along to our customers.

Wire or write us immediately for full information, prices and agency proposition. You can save on your own tires—give your friends a better tire with more wear for the money and make a good profit yourself.

Get your name in today before your neighbor does.

C. H. STODDARD RUBBER TIRE WORKS

Agency Dep't.

Worcester, Mass.

TIRES—NEW AND USED—TUBES

All standard makes. Call or send for price list. Repairing by experts.
Acme Tire & Repair Co., 342 W. Jackson Blvd., Chicago. Phone Monroe 2400.

NON-SKID TIRES.

All standard makes at the following prices:

Size	Price	Size	Price
30x3½	\$14.50	34x4½	\$27.00
32x3½	16.00	35x4½	28.00
32x4	20.00	36x4½	29.00
34x4	22.50	36x5	31.50
36x4	24.50	37x5	32.50

I do not carry any but standard make tires or deal in inferior brands. I will ship any size tire listed above to any part of the U. S. upon receipt of 10% of order, balance C. O. D. M. C. Moran, 334 Amsterdam Ave., New York City.

REO AND BUICK OWNERS.

Well known make of new factory second tires in two sizes only, 34x3½ Q. D. clincher or regular clincher, smooth, at \$9.50 each. 30x3½ Dunlop or straight side, smooth, \$8.25 each. Will furnish Goodyear rings at \$.75 each with tire order. Ten per cent with order, balance C. O. D., subject to inspection. Kastner Tire & Rim Co., 2112 Michigan Ave., Chicago, Ill.

TIRES.

New and Slightly Used Tires Far above the average. Our success has demonstrated that our goods are right and a trial will convince you. Send for circular NOW.
Serlin Tire Co.,
1073 14th Pl., Chicago.

TIRES. TIRES.

I will sell you good wrapped tread clincher tires cheaper than any one in the United States. New 1913 stock. 34x4 Case, \$14. all other prices accordingly. Write for prices.
D. Ogden,
Columbus, Ind.

Magnetos

MAGNETOS OF ALL MAKES

At half prices to reduce 1913 stock.
Pellets Magneto Exchange,
1463 Michigan Avenue,
Chicago, Illinois.

MAGNETOS

Repaired, remagnetized; prompt service on all makes.

Get our exchange proposition on new K-W for old equipment.
Spark Coil, Storage Battery and Carburetor Repairs.

Northwestern Distributors.
K-W magnetos, Schebler carburetors, Vesta lighting equipments.
Kellogg Self Starters and Tire Inflators.
Reinhard Brothers Co.,
Minneapolis, Minn.

Batteries

A BARGAIN; STORAGE BATTERIES, 6-80 and 6-160; guaranteed; all makes, new and used, \$3.50 to \$10 for short time only. 4105-7 Cottage Grove Ave., Chicago.

GUARANTEED BATTERIES.

6 volt 140 Amperes.....\$16.00
6 volt 80 Amperes..... 13.00
6 volt 60 Amperes..... 10.00
The Ampvo Battery Co.,
1607 Michigan Ave., Chicago, Ill.

Portable Garages

GARAGE.

Build your own. Plans, specifications and lumber list complete. Mailed upon receipt of \$1.00.

E. M. OSTLUND COMPANY,
9245 Edmonds Ave., Cleveland, Ohio.

GOOD PRIVATE AUTO GARAGES \$50 up, 14 sizes; wood and steel; well built and sold at honest prices. Write before you buy. J. A. Catherman, Beaver Springs, Pa.

Rebuilding and Repairing

AUTOMOBILE CYLINDERS REGROUND, new pistons and rings fitted. Garage Air Compressors. Cast Iron Brazing Co., Manchester, N. H.

ANDRE G. CATELAIN

General Machine Work
For Foreign and American Cars
Welding all kinds of metal
Everready Starter Service
Manufacturer Catelain Hose Coupling.
1446-8 Indiana Ave. Tel. Calumet 1187
Chicago.

AUTOMOBILE REPAIRING OF THE highest class at prices that are fair to both parties, has made possible our reputation for reliability. Estimates cheerfully furnished. Barrett Automobile Repair, 150 E. Indiana St., Chicago. Phones: North 7511. Automatic 43-482.

AUTO SPRINGS REPAIR CO.

We manufacture and repair springs. Proper action compound put in springs. 1331 Jackson Blvd., Chicago, Ill.

CYLINDERS REGROUND

And fitted with new pistons and rings. EXPERT REPAIRING AND REBUILDING Old parts satisfactorily repaired or duplicated. Cracked cylinders, gear cases, etc., perfectly welded and machined. Aluminum, bronze and brass castings of any design.
HANSEN-BUSCH AUTO CO.
23 Hubbard Place Chicago, Ill.

CYLINDERS REGROUND, NEW PISTONS

and rings fitted, gear cutting, of all kinds and materials, transmission and bevel gears, piston pins and push rods of chrome nickel steel, hardened, tempered and ground; guaranteed better than factory; old piston pins reground and fitted to your new pistons; old push rods reground and furnished with new guides, crank shafts, connecting rods, valves, crank cases, any part for your auto or motor; reproduced same as original but better; phosphor bronze bushings carried in stock. Send old or broken parts to go by. The shop of quality.

McCadden Machine Works.

St. Cloud, Minn.

CYLINDERS REGROUND AND FITTED
with new pistons and rings for \$7 to \$11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices. The Crown Machine Shop, Crown Point, Ind.

CYLINDERS REGROUND
and fitted with new pistons and rings for \$15 per cylinder. We make parts and cut gears of all kinds. Send us your old parts and we will repair or duplicate them in record time. Cracked cylinders, gear cases, etc., welded and made good as new. Aluminum, bronze and brass castings of every description. The Adapt Machinery Co., 1624 Wabash Ave., Chicago, Ill.

REPAIRMEN—SEND FOR FREE TREATISE. "How to Turn Up and Repair a Crankshaft with Combination Lathe Dogs." Strasburger Mfg. Co., 815 Hearst Bldg., Chicago.

THE FIXIT WINDSHIELD CO.
Expert repairers and reglazing of all kinds. All work guaranteed. A trial will convince you. 1919 S. Wabash Ave., Chicago.
Phone Calumet 4583.

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EXPERT VULCANIZING GUARANTEED.
Our low prices and quick deliveries have made us famous. Ask for our list of used tires.

Reinsberg Auto Tire & Supply Co.,
1239 Michigan Ave., Chicago.

Radiator and Lamp Repairing

A-A-A RADIATORS MANUFACTURED and repaired. Radiators of any make repaired and returned same day. We can make any style radiator and ship in three days.
Sheppard Co.,
1331 Jackson Blvd., Chicago.

ALL KINDS OF AUTO RADIATORS, hoods, fenders, lamps and windshields, etc., rebuilt and repaired. All work guaranteed. Also general sheet metal works. Phone or mail order. L. Blumenfeld & Co., 1919 Wabash Ave., Chicago. Tel. Cal. 4583.

ARROW RADIATOR REPAIR CO.,
1331 Wabash Ave., Chicago.
Expert repair work on Radiators, Hoods, Fenders, Dashes, Tanks and Drip Pans. We guarantee all our work.
Phone Cal. 1995.

CHICAGO MANUFACTURING COMPANY,
1466 Michigan Avenue, Chicago.

We are the only radiator manufacturers in Chicago making a square tube radiator. New guaranteed cores placed in old radiators. We also manufacture Hoods, Fenders, Tanks and Pans and do guaranteed repair work. Prompt service.

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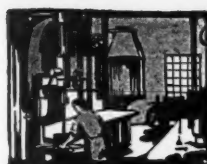
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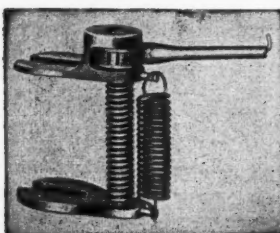
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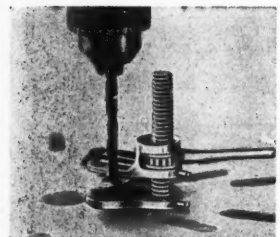
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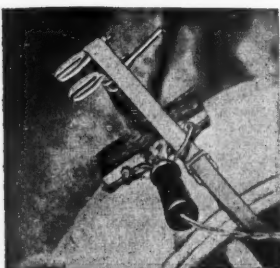
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Index to Advertisements

A.	G.
Ajax-Grieb Rubber Co..... 97	Gabriel Horn Mfg. Co..... 79
Albany Lubricating Co..... 79	Genter, J. H., Co..... 95
American Ball Bearing Co... 85	Gilbert Mfg. Co..... 86
Ames Motor Car Co..... 98	Goodyear Tire & Rubber Co. 94
Aristos Co. 76	Gramm-Bernstein Co..... 86
Atwater Kent Mfg. Co..... 76	Greenslade Oil Co..... 99
Auburn Automobile Co..... 91	Grossman, Emil Co..... 96
Automatic Appliance Co..... 70	Guide Motor Lamp Mfg. Co.. 93
Automobile Blue Book Pub. Co. 78	Gurney Ball Bearing Co..... 99
Automobile Supply Mfg. Co. 87	
B.	H.
Badger Brass Mfg. Co..... 87	Halliwell Co..... 91
Baldwin Chain & Mfg. Co... 82	Hartford Suspension Co..... 2
Barthel & Daly..... 88	Havers Motor Car Co..Back cover
Beaver Motor Mfg. Co..... 97	Haynes Automobile Co.....60-61
Beckley-Ralston Co..... 89	Haywood Tire & Equipment Co. 91
Borland-Grannis, The, Co... 99	Hazard Motor Mfg. Co..... 89
Bosch Magneto Co..... 86	Henderson Motor Car Co... 92
Braender Rubber & Tire Co.. 65	Herft, Edgar..... 85
Bricton Mfg. Co..... 84	Herft-Brooks Corp..... 90
Bridgeport Brass Co..... 91	Herreshoff Motor Co..... 97
Briggs-Detroit Co..... 88	Herz & Co..... 95
Broderick & Bascom Rope Co. 83	Hess Spring & Axle Co.... 94
Buckeye Mfg. Co..... 91	Holley Bros. Co..... 53
Buob & Scheu..... 99	Horton, F. L., Mfg. Co..... 107
Byrne Kingston & Co..... 95	Hotel LaSalle..... 82
	Hotel Woodstock 93
C.	Houk, Geo. W..... 86
Cartecar Co..... 94	Hoyt Electrical Instrument Works 99
Chase Motor Truck Co..... 90	Hupp Motor Car Co..... 58-59
Chicago Automobile Supply House 99	Hyatt Roller Bearing Co..... 86
Classified .....100 to 104	
Clearing House 105	
Cleveland-Canton Spring Co.. 91	
Cole Motor Car Co..... 88	
Connecticut Telephone & Elec. Co. 96	
Continental Motor Mfg. Co.. 62	I.
Corcoran Lamp Co..... 91	Ideal Steel Wheel Co..... 92
Covert Motor Vehicle Co..... 92	Indiana Rubber & Insulated Wire Co.....cover
Cox Brass Mfg. Works..... 54	Ingersoll-Rand Co..... 85
Cullman Wheel Co..... 99	Inter-State Automobile Co... 98
D.	J.
Dayton Rubber Mfg. Co..... 97	Jacobson Machine Mfg. Co... 86
Dean Electric Co..... 88	Jenkins Mfg. Co..... 83
De Soto Motor Car Co..... 94	Johns, H. W., -Manville Co... 97
Detroit-Wyandotte Motor Co. 4	Jones Electric Starter Co... 94
Diamond Rubber Co. of New York 88	Jones, Phineas, Co..... 80
Dixon, Joseph, Crucible Co... 84	Jones Speedometer, The.... 74
Dorris Motor Car Co..... 87	
Double Fabric Tire Co..... 97	
Duff Mfg. Co..... 55	
E.	K.
Eisemann Magneto Co..... 87	K-W Ignition Co..... 82
Electrical Specialties Mfg. Co. 89	Kamlee Co. 83
Empire Automobile Co..... 96	Keeton Motor Co..... 90
Essenkay Products Co..... 85	Kellogg Mfg. Co..... 52
	Kimball Tire Case Co..... 92
	Kissel Motor Car Co..... 72
	Knox Auto Co..... 84
	Koehler, H. J., S. G. Co....cover
	Lee Tire & Rubber Co..... 99
	Lovell-McConnell Mfg. Co.. 49
	Lozier Motor Co..... 87
	Lyons-Atlas, The, Co..... 71
Federal Rubber Mfg. Co..... 95	
Ford Motor Co..... 80	

Index to Advertisements

M.

McCormick Mfg. Co.....	81	Republic Rubber Co.....	87
McCue Co.	90	Rhineland Machine Works Co.....	92
McFarlan Motor Car Co.....	94	Robbins, Irvin & Co.....	95
McQuay-Norris Mfg. Co.....	76	Royal Equipment Co.....	93
Mansfield Tire & Rubber Co..	74	Rutenber Motor Co.....	93
Marburg Bros. Inc.....	98		
Marion Motor Car Co.....	93		
Maxwell Motor Co.....	96		
Mayo Mfg. Co.....	81		
Mercer Automobile Co.....	66		
Metal Specialties Co.....	106		
Metz Co.	90		
Mezger, C. A., Inc.....	78		
Michener, E. S.....	94		
Monarch Motor Car Co.....	63		
Morgan Mfg. Co.....	106		
Morrison-Ricker Co.....	83		
Mosler, A. R., & Co.....	89		
Motor Car Equipment Co.....	90		
Motor Car Supply Co.....	99		
Mott Wheel Works	95		
Mutty, L. J., Co.....	99		

N.

National Motor Vehicle Co...	50
National Rubber Co.....	84
New Departure Mfg. Co.....	67
New Era Spring & Specialty Co	99
New Process Gear Corp.....	84
New York & New Jersey Lubricant Co.....	98
Nordyke & Marmon Co.....	98
Northwestern Chemical Co...	83
Nyberg Automobile Works...	98

O.

Oakland Motor Car Co.....	92
Olds Motor Works.....	57
Owen, R. M., & Co.....	84

P.

Packard Electric Co.....	84	Ward Leonard Electric Co...	87
Paige-Detroit Motor Car Co.	99	Warner Gear Co.....	82
Parish & Bingham Co.....	99	Warner Mfg. Co.....	97
Pathfinder, The, Co.....	92	Weed Chain Tire Grip Co...	85
Peacock, Clarence N. & Son..	87	Western Electric Co.....	85
Pennsylvania Rubber Co.....	89	Wheeler & Schebler	48
Perfection Spring Co.....	95	Whitney Mfg. Co.....	3
Pilot Car Sales Co.....	84	Wiley & Russell Mfg. Co....	77
Polo Pneumatic Alarm Mfg. Co.	81	Willard Storage Battery Co..	51
Premier Motor Mfg. Co.....	93	Willys Overland Co.....	56-75
Prest-O-Lite Co.....	97	Winton Motor Car Co.....	96
Prosser, Thos., & Son.....	86	Wisconsin Motor Mfg. Co....	85
Pullman Motor Car Co.....	90	Woods Mobilette Co.....	77

R.

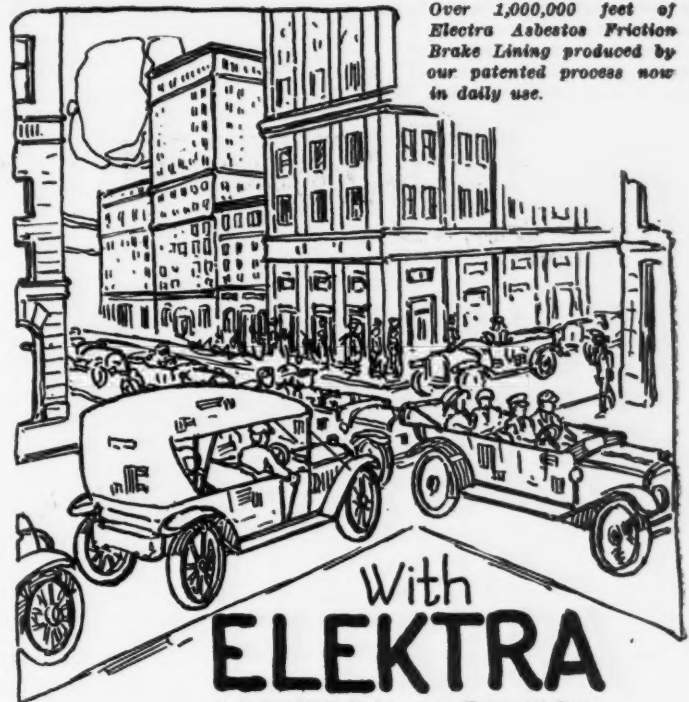
R. I. V. Co.....	99
Rajah Auto Supply Co.....	96
Rayfield Carburetor.....	92
Remy Electric Co.....	88

Y.

Yankee Co.....	99
----------------	----

Z.

Zenith Carburetor Co.....	89
---------------------------	----



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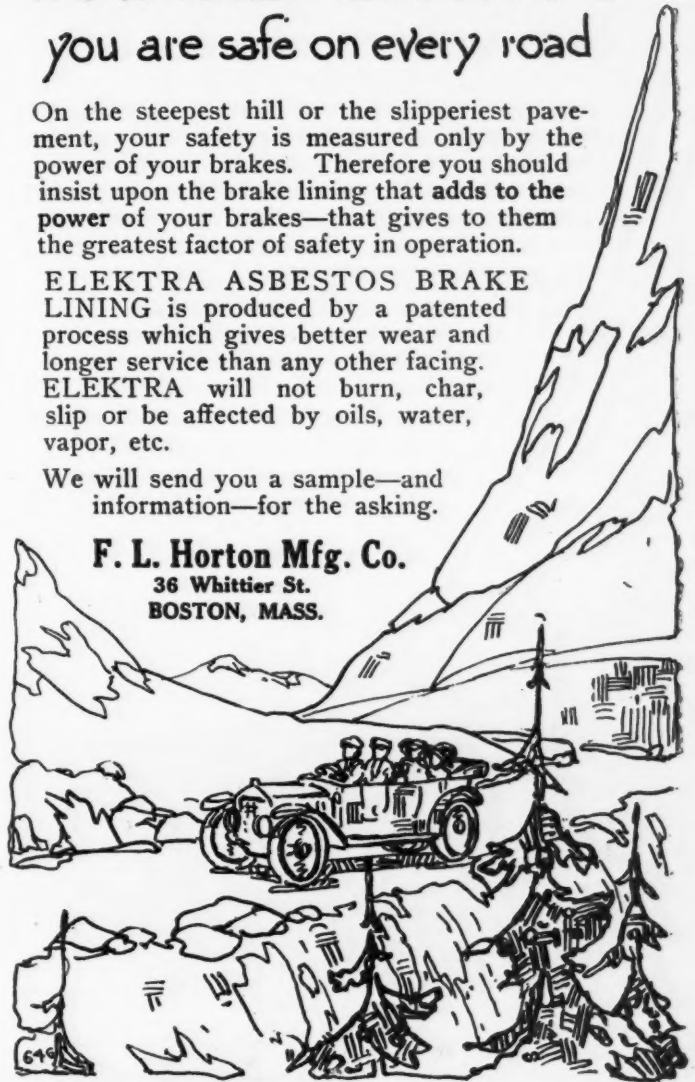
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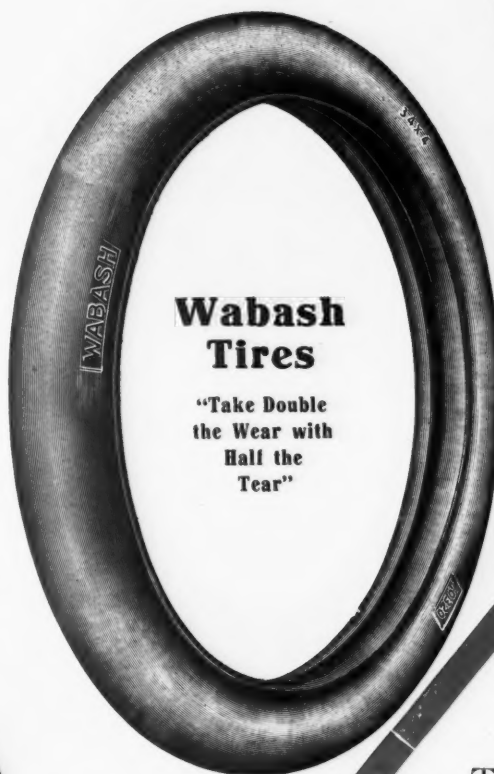
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Put the Rim
Cut Out of
Business"*

We also make Inner Tubes, Inner Liners, Inner Sleeves and Outer Boots, each of which is guaranteed to give perfect satisfaction. All are right accessories at right prices.

WRITE FOR CATALOG

**Indiana Rubber & Insulated Wire Co.
Jonesboro, Ind.**

CHICAGO REPRESENTATIVES:

K. FRANKLIN PETERSON, H. V. GREENWOOD, 122 S. Mich. Blvd.

EASTERN REPRESENTATIVE:

GEORGE R. HALL, 22 Imlay Street, Hartford, Connecticut

A High-Grade Six Alone In the Moderate-Price Field

This is a car that acknowledges us superior among sixes, in mechanical essentials, in quality, in equipment or in balance of power to weight.

It is distinctly, and distinctively, a high grade car.

Yet it is so priced that it makes a powerful appeal to buyers who appreciate and want the advantages heretofore confined to sixes of the highest cost, but who balk at the original investment.

These men have been forced to content themselves with sixes of less degree; or pay more than they wished.

Now comes the Havers 6-60—with all that any six can offer; actually competing with cars of the highest price by reason of its own quality, yet itself removed from the competition of these same cars.

The sales-possibilities of such a car are great, we believe.

So thoroughly do we believe in it that the Havers output for

1914 has been increased over any previous year.

Havers dealers easily disposed of all the cars we could give them for 1913; and could have handled more.

The car has behind it a successful history as the pioneer among moderate-priced sixes.

It is progressing on the basis of a sound reputation and satisfactory performance; and such foundation is necessary to the manufacturer and his dealers.

This is the foundation that is already laid for you in the Havers.

Keen business instincts are convincing dealers of the soundness of the Havers proposition; and men who have the equipment to market a high-grade six are adding the car to their other lines.

We advise immediate action if you care to consider the Havers proposition.

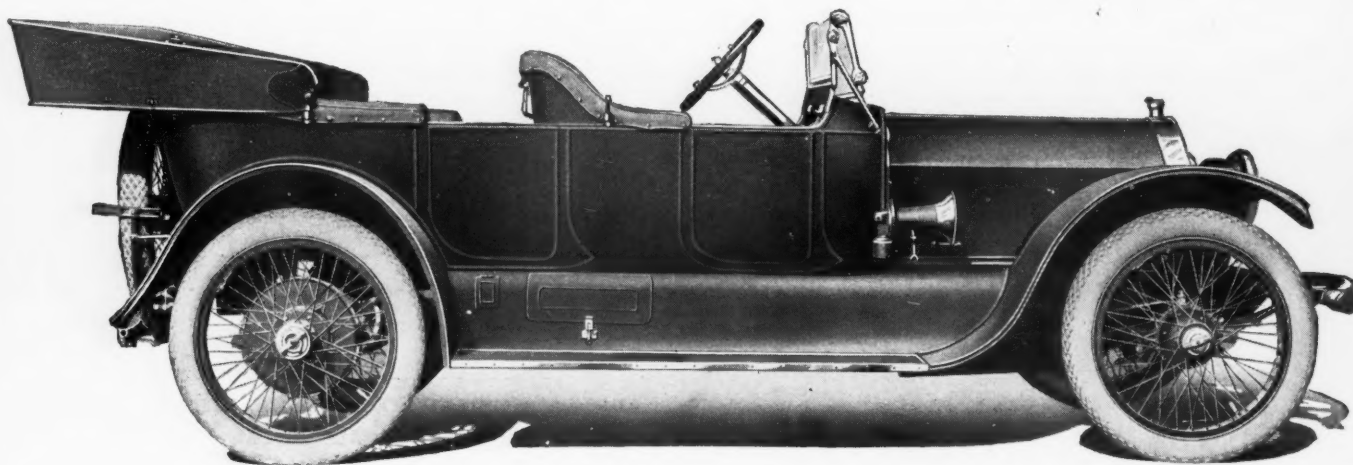


1914 Features

- Seven passenger body
- Seat covers
- Front bumper
- Rear double tire irons
- Klaxet horn
- Power tire inflator
- Rain vision windshield, built as part of body
- Gasoline gauge
- Air pressure gauge
- Eight-day clock
- Ammeter
- Volt meter
- Large dial speedometer
- Two cowl-board lights
- Tonneau light
- Oil can holders
- Electric starter and lights
- 10 gallon reserve gasoline tank at rear
- Foot scrapers on running board

Havers Motor Car Company,

Port Huron, Mich.



Havers 6-60—\$2485, with the most complete equipment ever put on a car as "regular"
Havers 6-44—\$1985, with complete equipment